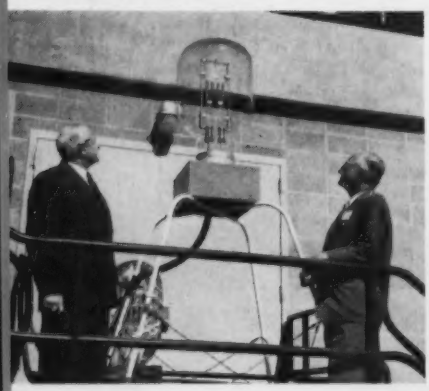
ELECTRICAL WEST

Part I

November 1954
50 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.



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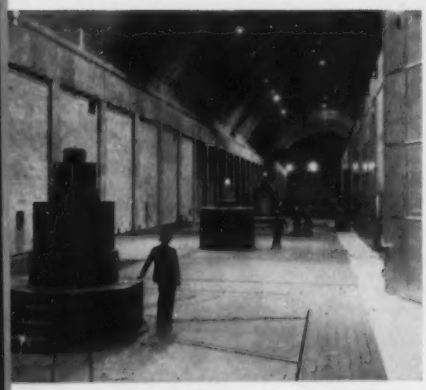

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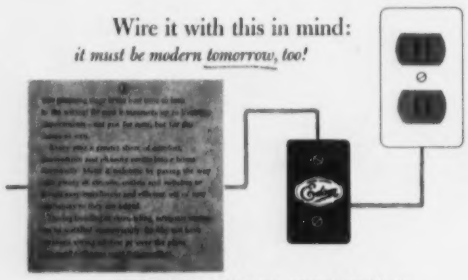
Manufacturers' Directory Issue

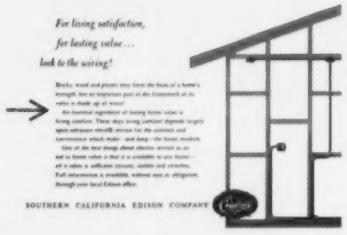
Basically Sound!

The uses of electricity in the average home are multiplying year by year. And so is the need for wiring sufficient to handle the increasing load. Surveys show that without some improvement, all too many of today's homes will be electrically out-of-date tomorrow.

Telling the wiring story to architects, builders and homeowners is the job assigned to a continuing series of Edison advertisements. It is basic strategy, and should be of interest to everyone who makes or sells electrical appliances. Adequate wiring in a home means easy installation, satisfactory performance and maximum convenience—three strong and effective appliance selling points!

SOUTHERN CALIFORNIA Edison





SOUTHERN CALIFORNIA EDISON COMPANY

"FOLLOW THE TREND"

approved recessed lighting

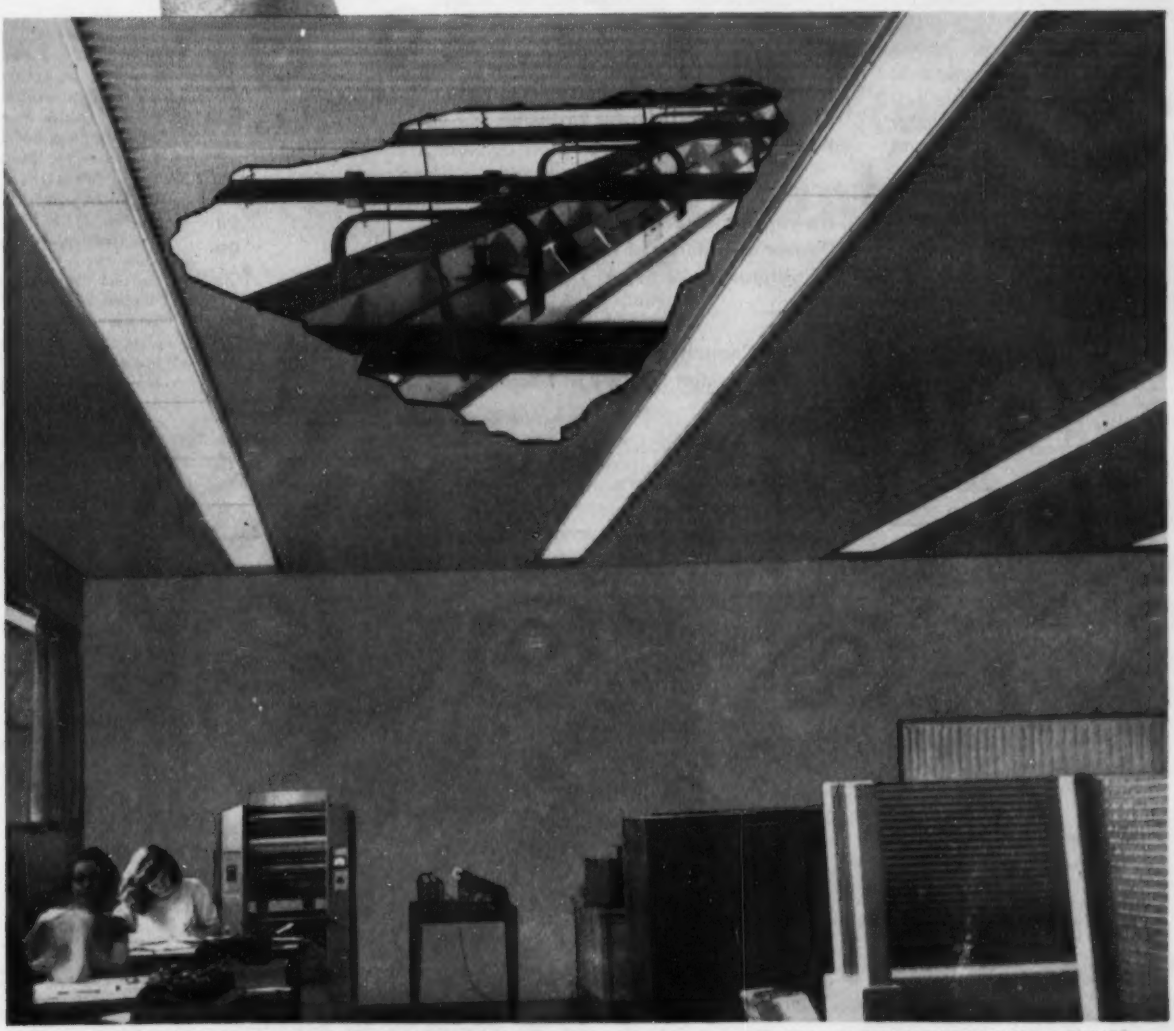
SMOOT-HOLMAN

ARCHITECTS AND BUILDERS PREFERENCE

SMOOT-HOLMAN

RECESSED TROFFERS

A CLEAN CEILING AND THE FINEST IN LIGHTING FOR THE LATEST IN QUALITY LIGHTING BE SURE TO CALL OR WRITE US FOR BULLETIN NO. 168



BRANCH OFFICE AND WAREHOUSE SAN FRANCISCO • SALES OFFICES IN MOST PRINCIPAL CITIES

NOVEMBER 1954

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-seventh year of publication

VOL. 113
NO. 5

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor
Peggy Boyer, Associate Editor
Walter C. Heston, Engineering Editor
John Cootz, Typography

Next Month

The December issue will lead off with an outstanding address by A. H. Gudie before the National Association of Electrical Distributors in which he made a straight forward presentation of the problems brought on each other by wholesalers and contractor-dealers in the distribution of supplies and appliances.

In engineering there will be a timely article on the 287-kv and 345-kv transmission plans of the Bonneville Power Administration.

A piece on air raid warning schemes will discuss the fallacy and impracticability of several proposals that would make use of power or telephone systems to trigger a warning device.

Features of a desert steam - electric station in Arizona will make an interesting article.

A piece on design and construction of a new Montana transmission line will show how costs were cut.

We expect also to have the San Francisco underground cable job promised for last month.

Lighting and wiring will have an article on the new University of California Hospital in San Francisco. This job is noteworthy because of size and completeness of the electrical systems installed.

The Contractors' News Letter and the Sales Guide News Letter will be must reading for those who want to keep informed.

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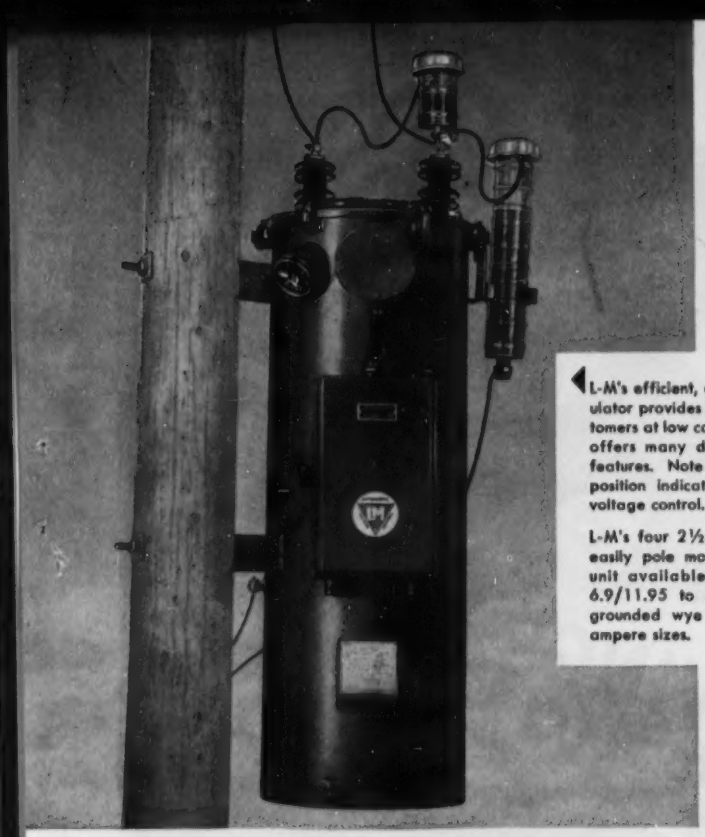
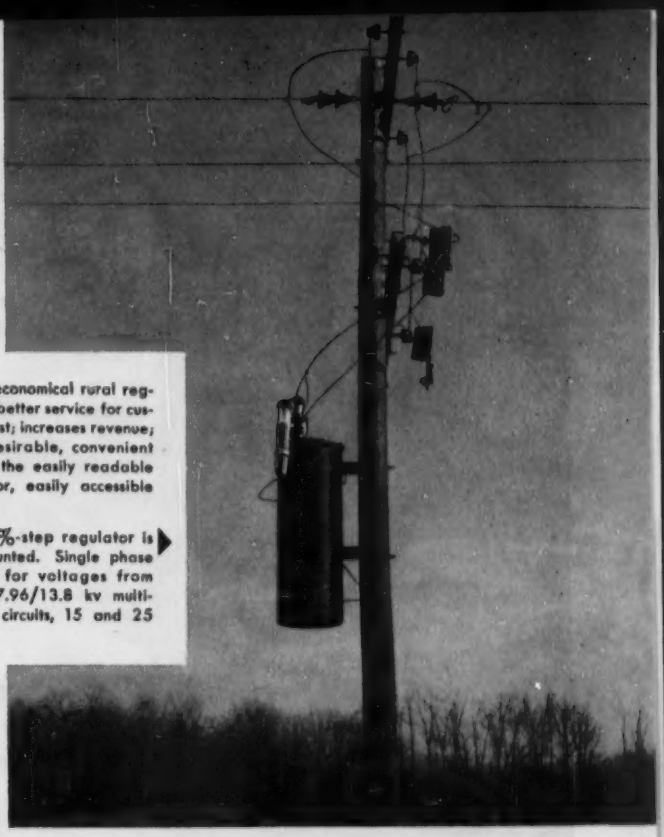


◀L-M's efficient, economical rural regulator provides better service for customers at low cost; increases revenue; offers many desirable, convenient features. Note the easily readable position indicator, easily accessible voltage control.

L-M's four 2½%-step regulator is easily pole mounted. Single phase unit available for voltages from 6.9/11.95 to 7.96/13.8 kv multi-grounded wye circuits, 15 and 25 ampere sizes.▶



L-M Offers New, Simple Regulator For Rural Service at Only $786!

You don't have to spend a lot of money for adequate regulation on rural lines. L-M has developed a new rural regulator, with four 2½% steps, that will give adequate, dependable operation where conditions do not require critically fine regulation.

The use of this regulator increases revenue—probably enough to pay for the regulator in the first year, in many cases. It provides the customer with better performance of appliances, lights and other electrical equipment—and it costs only $786 in the 15 ampere size, $951 in the 25 ampere size.

The L-M regulator is available in 7620 volt rating, 15 and 25 ampere sizes, 60 cycle, single phase. Four 2½% steps provide 10% boost; 7½% boost and 2½% buck; 5% boost and 5% buck; 2½% boost and 7½% buck; or 10% buck. For use on 7.62/13.2, 7.2/12.47, 7.96/13.8, and 6.9/11.95 kv multi-grounded wye circuits (common terminal grounded to tank). Control winding is tapped so control voltage can be 120 volts for either 7620 or 7200 volt primary operation. Contact-making voltmeter can be adjusted to maintain any voltage level between 110 and 130 at recommended band width of ± 2 volts.

Principal Features of L-M's New Regulator

Rugged long-life tap-changing mechanism.

Low contact maintenance.

Detachable, easily adjustable control—with L-M's accurate, contact-making voltmeter. Control can be installed at the base of the pole.

Electrically operated counter on the control, where it is easily accessible for record-keeping.

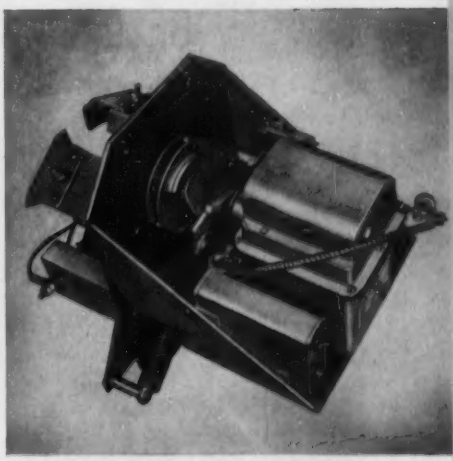
Scientifically designed speed control in tap changer prolongs contact life.

Large tap position indicator easily read from the ground.

Geneva gear drive provides positive contact positioning.

Mechanical stops in addition to limit switches.

Core-coil assembly is L-M's exclusive Round-Wound (TM) design. Tank is filled with ORTO®, L-M's inhibited oxidation-resistant transformer oil.



View of tap changer mechanism showing simplified design and construction.

Get Complete Information

Ask the L-M Field Engineer for details and Bulletin RV1 on the L-M Regulator. Or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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LINE MATERIAL *Regulators*

WHY IT WILL PAY YOU TO USE BELL SYSTEM COMMUNICATIONS SERVICES

You save money

With Bell System services, you get efficient and dependable communications at low cost. You are relieved of maintenance, depreciation and other costs of privately owned communications.

You get the service you need

It's flexible and complete. We furnish communications tailored to your exact needs. No more, no less. A change in number or type of circuits can be made any time to keep your communications in step with changing needs.

You get the best service

The Bell System is constantly developing new equipment, methods and techniques to improve your service and keep your communications from becoming obsolete.

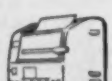
You have more investment money available

Your capital is *not* tied up in communications equipment but is available for investment in income-producing power equipment and services.

You concentrate on your own business

Our business is entirely communications, and that's one reason the Bell System offers power companies the finest services today. A communications study by specialists, made without charge, frequently indicates how a power company can improve its communications and realize increased benefits and economies. Talk this over with the Bell Telephone representative near you.

PRIVATE-LINE TELEPHONE

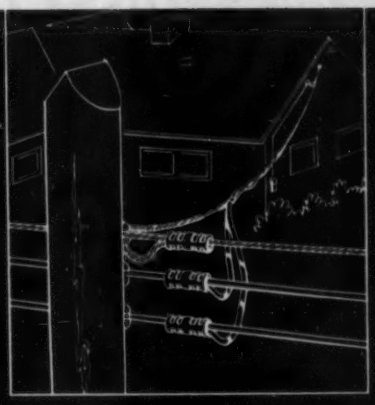

TELETYPEWRITER

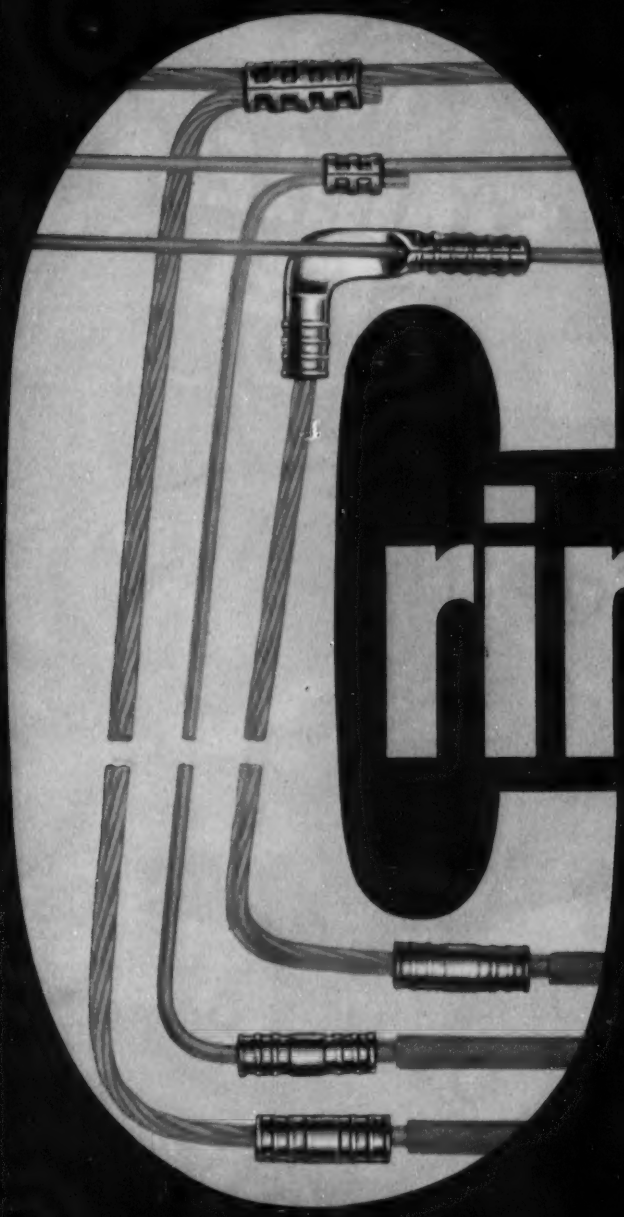
MOBILE TELEPHONE

METERING CHANNELS

BELL TELEPHONE SYSTEM

from pole to house entrance...





Crimpit

COMPRESSION CONNECTIONS

Simplified hand or hydraulic installation tooling insures fast, fool-proof, economical connections with minimum investment in tools and dies. Write for Bulletin CR.

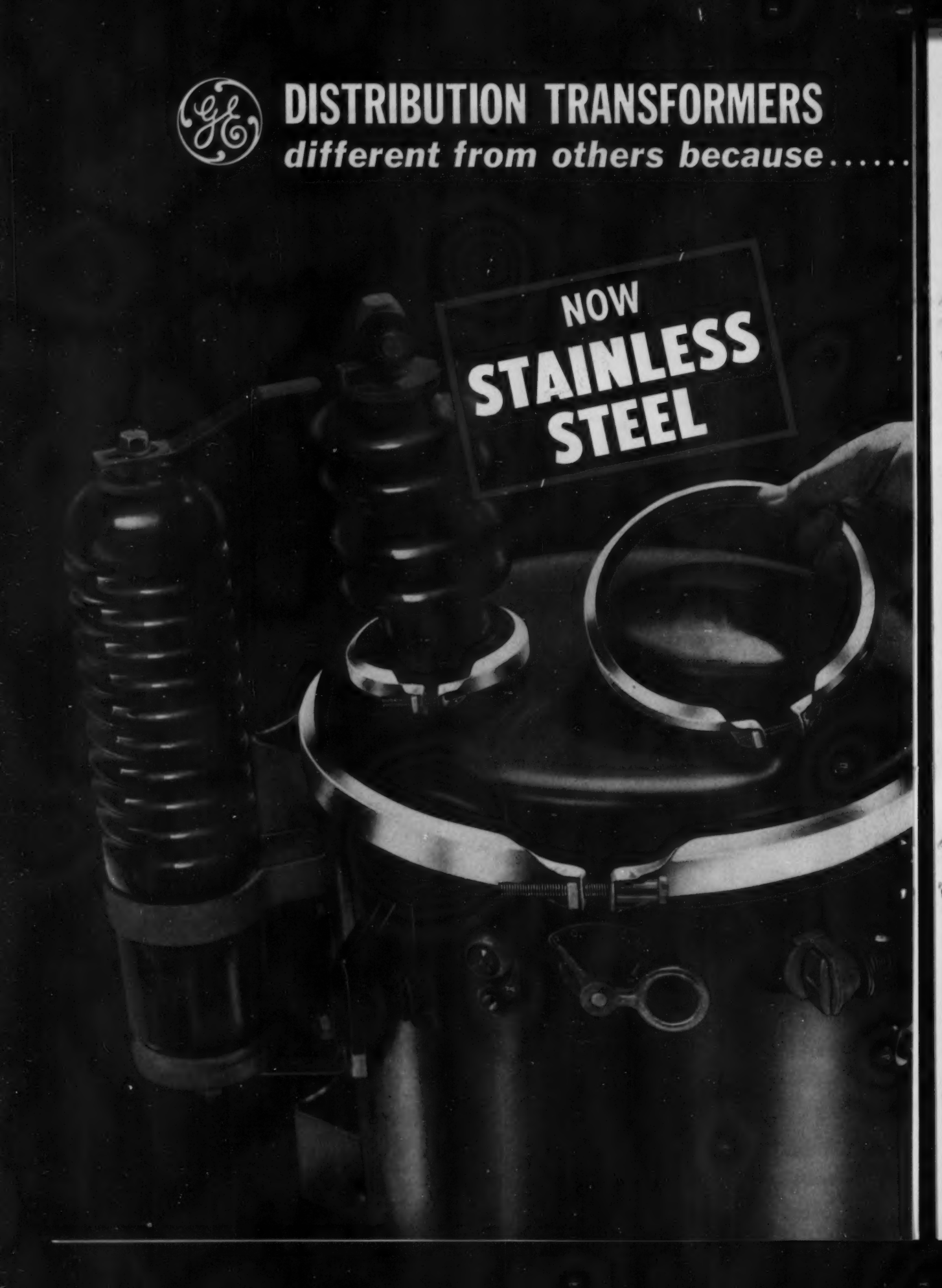
BURNDY

54-16

NORWALK, CONNECT. — TORONTO, CANADA • *Factories:* NEW YORK, CALIF., TORONTO • *Export:* PHILIPS EXPORT COMPANY

DISTRIBUTION TRANSFORMERS

different from others because.....



...Stainless Steel Clamping Bands

prevent rust and corrosion . . . easy to put on and take off

One-piece cover bands on cover, handhole cover, and bushings of General Electric distribution transformers are easy to remove for inspection or maintenance—and are just as easy to replace. Only a screwdriver is needed to loosen or tighten the one bolt which holds each band in place.

Exerting even pressure on nitrile gaskets, the clamping bands assure an airtight seal. This prevents oil contamination even after years of service and results in longer transformer life.

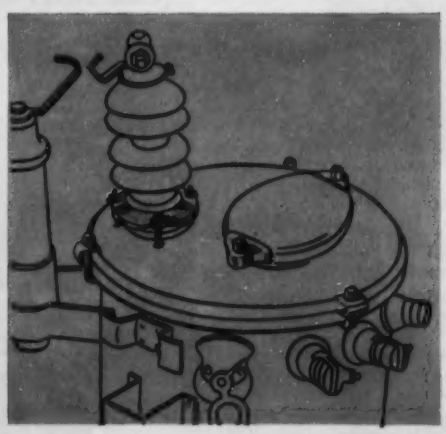
CORROSION IS GREATLY REDUCED by this new G-E design which eliminates bolt clamps and welded projections which can trap moisture and thus cause corrosion. In addition, all G-E bands and bolts (plus Belleville washers on the cover and low-voltage terminal clamps) are made of ***stainless steel*** to prevent corrosion. (The bands, however, are painted blue-gray to harmonize with the tank.) A coating of Neoprene rubber is vulcanized to the inside of each band to prevent its scratching the tank or cover and starting the corrosion cycle.

REMEMBER . . . all transformers are not alike . . . compare them all and see for yourself why General Electric is your best transformer buy.

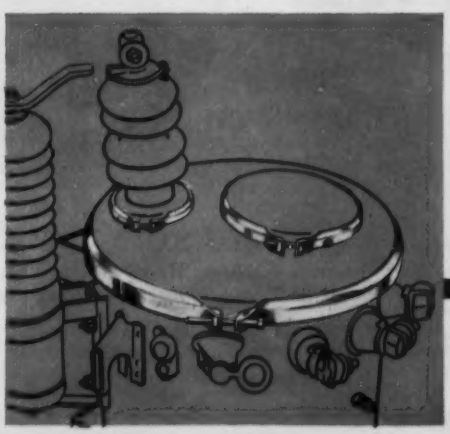
For more information on distribution transformers, either self-protected or conventional, contact your nearest G-E Apparatus sales office or agent, or write to General Electric Company, Section 431-16, Schenectady 5, New York.

Progress Is Our Most Important Product

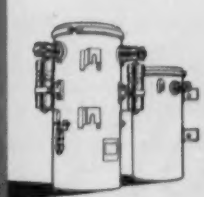
GENERAL ELECTRIC



ORDINARY COVER with bolt-clamps and other projecting surfaces of ordinary carbon steel offers many spots for rust and corrosion to set in.



NEW G-E COVER with its stainless-steel clamping bands has a clean functional design that gives maximum protection against corrosion.



SELF-PROTECTED CONVENTIONAL

"Take your choice G.E. makes both"

FIFTY YEARS

of

Saving Time

FOR CONTRACTORS

With Products Designed To Do

Better Jobs Quicker

HAS BEEN THE RECORD

of

STEEL CITY'S Complete Line of ELECTRICAL BOXES and COVERS*

that has kept pace with changing requirements, not only enables electricians to do *better jobs* but . . . easy-to-remove knockouts . . . brackets, ears and nailholes for most convenient mounting . . . clamps providing free access and positive clamping of wires . . . screws staked to prevent falling out during transit, all combine to save installation time.

STEEL CITY ELECTRIC CO. 1207 Columbus Avenue PITTSBURGH 33, PA.

STEEL CITY CABLE and CONDUIT FITTINGS*

are designed from a thorough knowledge of their individual needs, meeting their requirements most satisfactorily. The high quality material of which they are made, plus careful inspection along production lines and before packing eliminates loss of installation time due to imperfect fittings reaching the job.

STEEL CITY-KINDORF

Channel, Clamps, Hangers and Concrete Inserts for Supporting Conduit, Lighting Fixtures and Electrical Equipment

—have been designed from a thorough understanding of their requirements and to enable electricians to make conduit installations—from the simplest to the most complex—at a saving of time

OUR 50th YEAR

WEST COAST REPRESENTATIVES WITH WAREHOUSE STOCKS

SEATTLE—NORTHWESTERN AGENCIES, 4130 First Avenue, South

LOS ANGELES—MURPHY-HAIN COMPANY, 720 East Second Street

SAN FRANCISCO—HODGES & GLOMB, 1264 Folsom Street

*Underwriters Approved

Connect lights with but a simple twist

Imagine the convenience and savings. With BullDog Universal Trol-E-Duct® in your plant you can move lighting fixtures in minutes, even shift around your entire lighting arrangement . . . without rewiring, without downtime, without spending an extra nickel for electrical materials.

That's because Trol-E-Duct provides an outlet every inch along its length. To connect a light, all you do is insert a twistout plug or mobile trolley anywhere into the bottom of the duct. To add extra lights, just attach more fixtures and twist in connections while the current is on. There's no downtime. No conduit or cable to install or splices to be made. No special supports to change or buy, either. BullDog Universal Trol-E-Duct both *feeds* and *supports* lighting fixtures. Ideal for light duty or portable hand tools, too.

Investigate Universal Trol-E-Duct for your company. It is far easier and faster to install than fixed wire and conduit systems. It pays for itself many times over in convenience and in *cash saving* it creates by eliminating downtime and materials waste.

See your electrical contractor for full details, or write to BullDog Electric Products Company, Detroit 32, Michigan. Ask for Bulletin UT-650. Export Division: 13 East 40th Street, New York 16, New York. In Canada: BullDog Electric Products Co. (Canada), Limited, 80 Clayson Road, Toronto 15, Ontario. ©BEPCO

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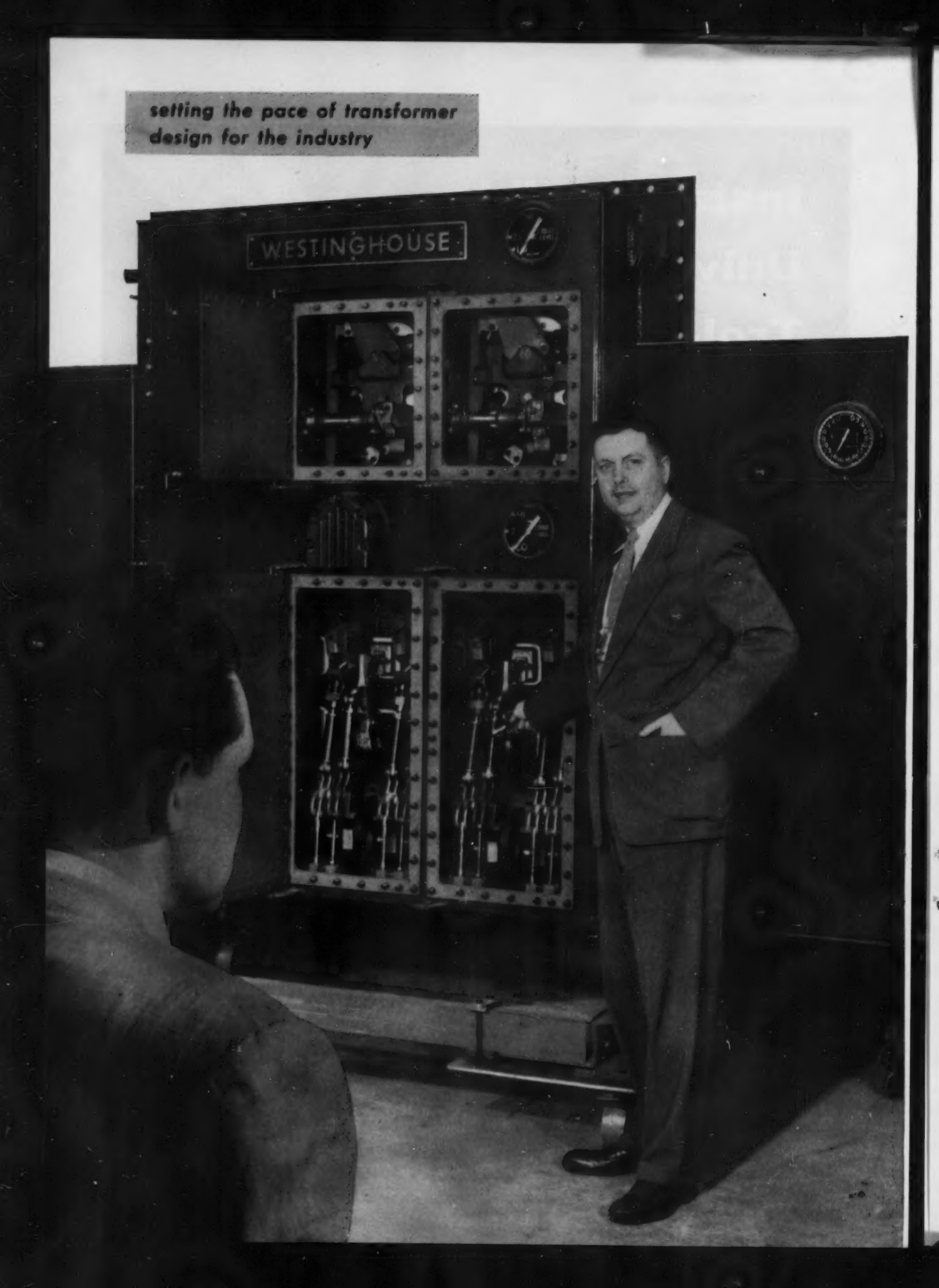
setting the pace of transformer design for the industry



NEW URT TAP CHANGER . . . THE MOST DURABLE EVER BUILT!

300% more fault capacity
200% faster arc quenching

The new Westinghouse URT Tap Changer, for 15,000 through 100,000 - kva power or regulating transformers, combines the rugged construction and proven direct-drive mechanism of the superseded UNR with new features to provide you with the longest, trouble-free service, yet. For instance—

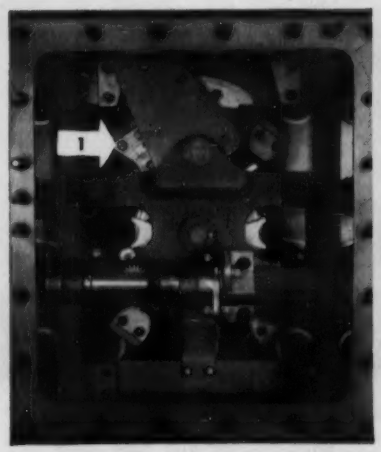
New contact design on the moving contacts of the selector switch and main stationary contacts of transfer switches provides 300% greater current-carrying capacity for operation under fault conditions. It accomplishes this through magnetic attraction between two spring-loaded copper bars with coin silver contacts. Proper contact is maintained for normal loads and as fault current value increases, magnetic attraction between the bars increases contact pressure as needed. Spitting—hot spots—contact welding are thus eliminated.

New arcing switch for the transfer switch assembly decreases arcing time, for example, from a full cycle to one-half cycle—an improvement of 200%. A double-butt arcing contact, with an arcing chamber and magnetic "blowout", makes this possible. The inserts of the main arc tips have a greater than ever life potential.

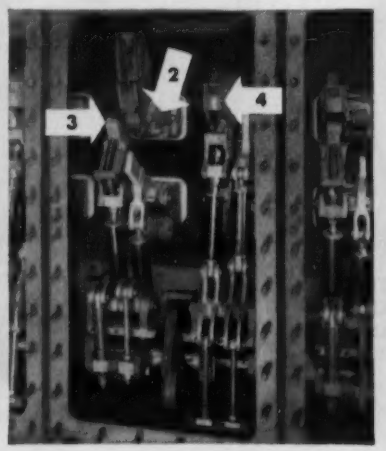
The new URT simplifies inspection, too. Each selector and transfer switch has its individual door—held with stud protecting cap nuts. No more reaching around or through other phase units.

This TCUL development, and the many preceding it, is tangible evidence of the Westinghouse tradition in setting the pace of transformer design for the industry. For more information call your nearby Westinghouse Representative or write Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

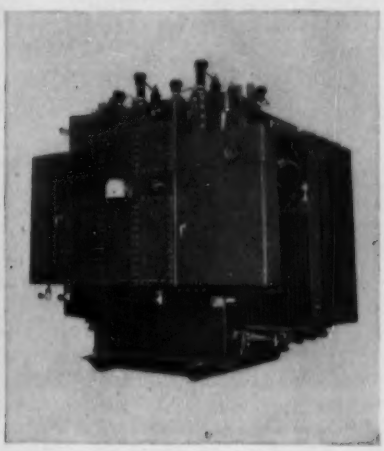
J-70733



300% greater fault-current capacity in this selector switch moving contact (1), and main stationary contact of the transfer switch (2), through principle of magnetic attraction.



200% faster arc quenching is provided by the combination of a double-butt arcing contact (3), arcing chamber and magnetic "blowout" (4) ... for increased contact life.



Note single, compact housing for all components of the URT. Front-operated demountable doors individually house all selector and transfer switches.

YOU CAN BE **SURE**...IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER

Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.

Youngstown

QUALITY V YOUNGSTOWN SERVICE

A few quick turns of the hand-reamer and this piece of Youngstown Buckeye Rigid Steel Conduit is ready to protect vital wiring. Reaming Youngstown Buckeye is faster because every length is uniform, top-quality steel. It cuts easily with a minimum of burrs, threads perfectly, to result in positive protection for wiring under all conditions.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

new DESIGN...

more protection with full accessibility

* New Allis-Chalmers slip-ring motor with inspection cover and upper half of end shield removed. Note accessibility of brushes, protection of bearing.

ALLIS-CHALMERS LARGE SIZE SYNCHRONOUS AND WOUND-ROTOR MOTORS have been completely redesigned with longer stator yokes and shorter end shields. Collectors and brushes are located inside the yoke for protection against physical damage, dripping moisture, dust and dirt.

Capsule-type bearings give better bearing protection, too. The upper half of the end shield may be removed for inspection or cleaning of the interior of the motor without disturbing the exciter or exposing the bearing to the ravages of dirt, dust and oil contamination.

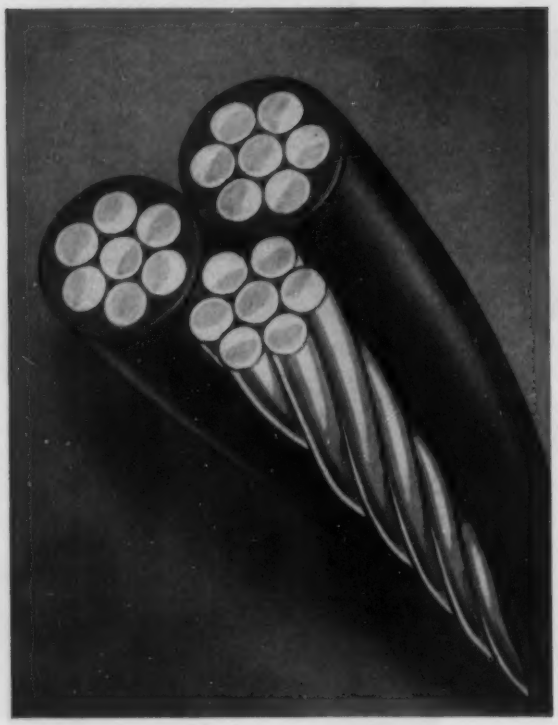
All leads enclosed — Both primary and secondary winding leads are brought out through separate conduit boxes. There is no loose wiring . . . no exposed leads anywhere.

Easy maintenance — Even though the new design offers maximum protection to brushes and collectors, internal parts are fully accessible for inspection and maintenance through large openings in the stator yoke. Opening covers are readily removed and are secured during operation by easy-operating, self-locking fasteners.

Get details now — This new design is available from approximately 250 hp at 300 rpm and up, in drip-proof and splash-proof construction. Call your Allis-Chalmers representative for complete details or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 05R8183. A-4464

ALLIS-CHALMERS

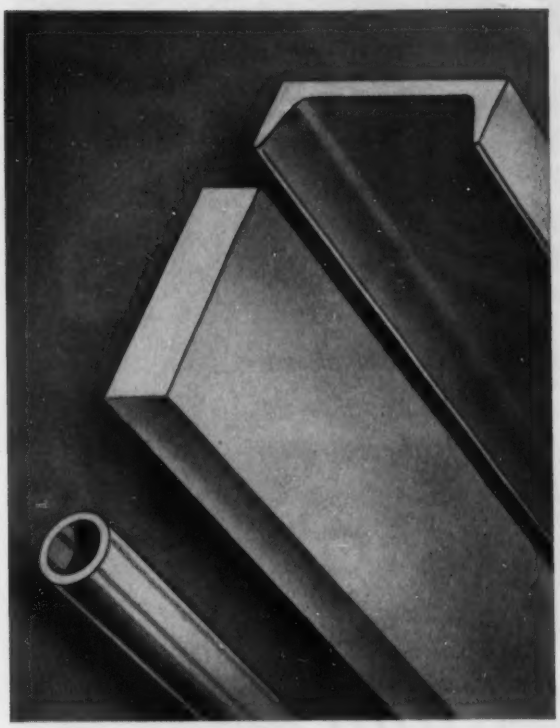
ACSR and All-Aluminum Wire and Cable



Covered Wire and Service Drop

There is only ONE transmission conductors, accessories backed experience...

Rectangular and Tubular Bus

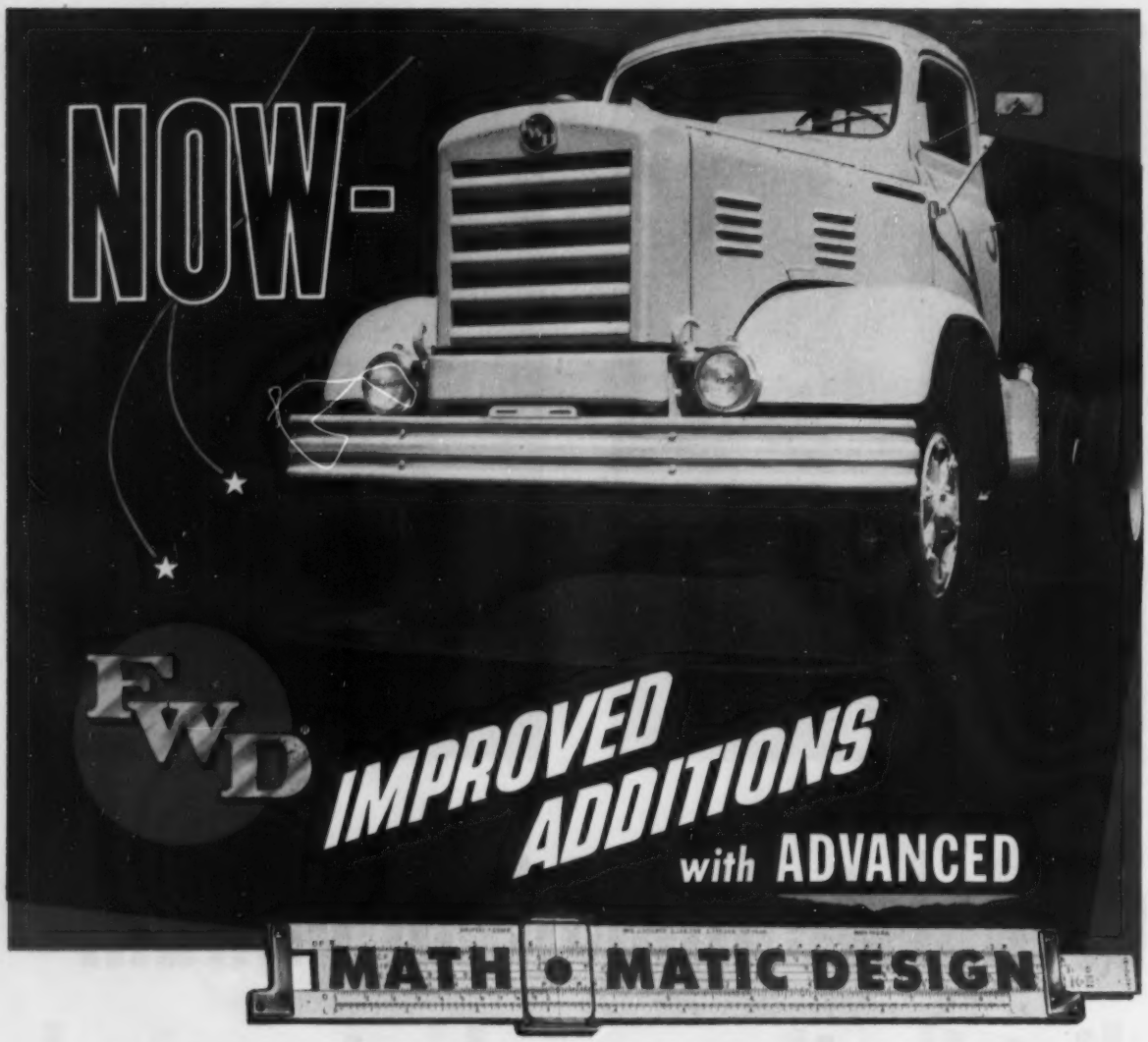


Fittings and Accessories

complete line of aluminum distribution conductors and by 56 years of

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA



Every pound *helps haul itself* on these advanced FWD trucks. That's because it's "working weight." Improved Math-Matic Design—*exclusive* on FWD's—correctly proportions power to weight on front and rear axles. Each wheel's load makes it *grip harder*, using every ounce of power for greater controllable traction *on* or *off* the road.

From 30 to 37% longer tire life* . . . up to 82% more tractive ability* . . . safest by far to operate under *any* driving conditions* . . . all these extra values without extra fuel consumption—here are dollar and *sense* reasons why *you* should get full facts immediately on this greatly advanced line of heavy-duty trucks. Four-wheel-drive and six-wheel-drive models for any "truck-killing" job

★ **Greater power-weight ratio, higher RPM, thru new engine design!**

★ **Lower maintenance costs because of standardized parts!**

★ **Larger legal payload thru better weight distribution!**

★ **New comfort—convenience—safety in completely redesigned cab!**

FWD

BUILDERS OF AMERICA'S FOREMOST HEAVY-DUTY TRUCKS

*TRUCK RESEARCH PROJECT CONCLUSIONS
Write now for your free copy of
"The Truck That Went To College."

THE FOUR WHEEL DRIVE AUTO COMPANY, CLINTONVILLE, WISCONSIN, *Canadian Factory,* KITCHENER, ONTARIO

SAVE

$64.25 PER 1000 FEET

with Kaiser Aluminum Triplex

As YOU SEE in the box below, when you switch from three open wire copper services to Kaiser Aluminum Triplex you save up to $64.25 per 1000 feet—based on reports from 10 utilities.*

You can be sure of getting the *maximum* savings from Kaiser Aluminum Triplex by taking full advantage of Kaiser Aluminum service. Experienced Kaiser Aluminum field engineers work with your crews right in the field where desired, demonstrate ways to speed installations and cut costs.

ACT NOW—as hundreds of power companies are doing! Convert to Kaiser Aluminum conductor easily, efficiently, economically—and save thousands of dollars a year. Contact any Kaiser Aluminum sales office listed in your telephone directory, or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc. General Sales Office, Palmolive Bldg., Chicago 11, Ill.; Executive Office, Kaiser Bldg., Oakland 12, Calif.

Kaiser Aluminum

The nation's largest producer of triplex and aluminum weatherproof conductor

Here is a typical example of the big savings possible with Kaiser Aluminum Triplex

INSTALLED COSTS FOR 10 SERVICE DROPS (Average Length of 100 ft.)

	#6 Solid TBWP Copper	#4 Kaiser Aluminum Triplex (Oyster)
Cost of conductor	$135.15	$103.00
Cost of pole taps, entrance connectors, house wireholders	15.30	14.70
Total materials cost	$150.45	$117.70
Total labor cost	80.80*	49.30*
TOTAL COST	$231.25	$167.00

TOTAL SAVING—$64.25—PER 1000 FT.!

*Average labor costs based on reports from 10 utilities in various sections of the country that have switched from three open wire type service to Kaiser Aluminum Triplex.

If you have a question on accessories, your local Kaiser Aluminum conductor engineer will be glad to advise you. Call him now.

Invest in

Protection

against mechanical impact

Get Locke **MICROGLAZE***

Suspension Insulators

LOCKE

LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

*Trademark of General Electric Company

1,000 Homes...50,000 Dependable splices!

When the Henderson Electric Co. got the wiring contract for the 1,000 home Highgate Springs Housing Project in Louisville, Ky., they chose "Scotchlok" Electrical Spring Connector and "Scotch" 33 Plastic Electrical Tape for the estimated 50,000 splices. They wanted highest quality splices—easily made.

You see, with "Scotchlok" you simply twist it on and you've got a safe, compact connection that just won't shake loose—ever! No tools needed.

Insulate with "Scotch" 33—the super-thin plastic tape with 10,000 volt dielectric strength, and you'll never have a call-back because the job is done right the first time!

A few quick twists, and a "Scotchlok" splice is made, ready to insulate with "Scotch" 33 Plastic Tape.

SCOTCH BRAND Electrical Products

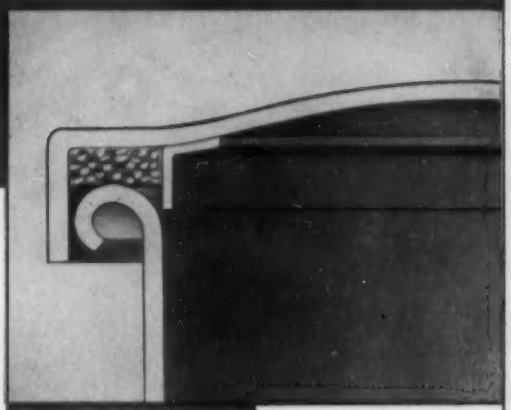
The term "Scotch" and the plaid design are registered trademarks for the more than 300 pressure-sensitive adhesive tapes made in U.S.A. by **Minnesota Mining and Mfg. Co., St. Paul 6, Minn.**—also makers of "Scotch" Brand Magnetic Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ont., Can.

3M COMPANY

Moloney HiperCore Distribution Transformer sealed-tank construction has won the seal of approval from operating engineers. No air or moisture can enter... greatly increasing life of oil and insulation. To assure this perfect, lasting seal which protects these HiperCore Transformers, Moloney uses a resilient Corprene gasket that is held in place by a welded-in retainer ring. Corprene makes a positive seal... impervious to oil, gas, moisture... it conforms to tank top and lip contours. Though tightly compressed to make a leak proof seal, the uncemented gasket retains resiliency for years... can be reused if ever required.

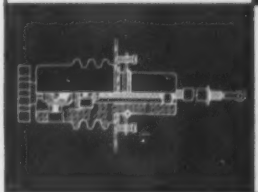
Part by part, Moloney HiperCore Transformers offer you "dependable service," ... the mark of Moloney equipment for 58 years.

ME54-39



Tank base bonded to shell by continous seam weld to protect against handling and weather. Inside edge coated with sealing mastic and rolled in to form lasting barrier against moisture, air and rust.

Low voltage bushings keyed to fit into notched hole in tank wall, thus lineman, tightening connections cannot rotate bushing, eliminating danger of accidential contact between "hot" lines.



Moloney sidewall mounted high voltage bushings are provided with a molded, high impact resistant phenolic-cold rubber protective cap for working "hot".

Tap changer operating handle located above hot oil level. Double-moving contacts snap into position with a wiping action to assure positive contact.

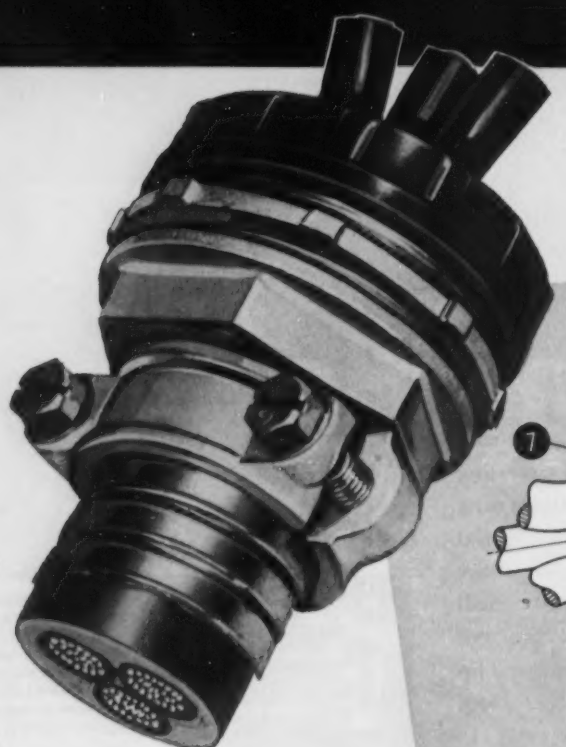
MOLONEY ELECTRIC CO.

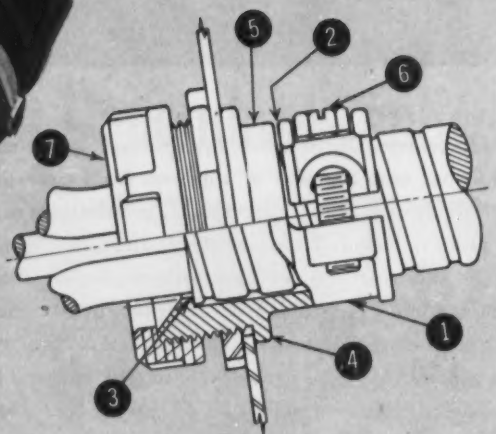
Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Tap Changing Transformers • Load Center Transformers • Unit Substations • Network Transformers • Constant Current Transformers • Capacitors Transformers For Electronics

SALES OFFICES IN ALL PRINCIPAL CITIES
FACTORIES AT ST. LOUIS 20, MISSOURI
AND TORONTO, ONTARIO, CANADA

from every angle–

O.Z. TYPE "PK" is the clamp





1. Cadmium-plated malleable iron body and clamping cap for strength and corrosion resistance.
2. Armor clamped several turns from end.
3. Smooth armor stop assures termination at proper point—protects cable insulation from sharp, rough edges.
4. Flange on body eliminates locknut outside of cabinet.
5. Large hex facilitates installation.
6. Slotted hex-head clamping bolts can be tightened by wrench or screwdriver.
7. Strong O.Z. Type A hi-impact phenolic insulating bushing.

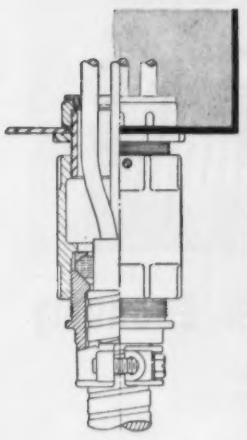
Here is a clamp designed specifically to meet the requirements of interlocked armor cable applications. The O.Z. Type "PK" Clamp provides exceptional speed and ease of installation, whether your cable enters the cabinet from the top, bottom or side. It is designed with ample thread length for use with all standard conduit fittings and terminators from 1" to 5" and is available for interlocked armor cable ranging in size from .99" to 4.38" O.D.

Call your local O.Z. Distributor.

for ARMORED CABLE

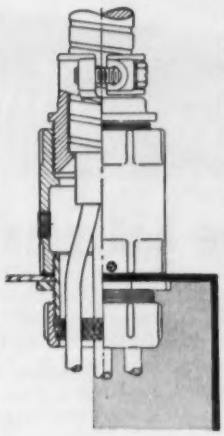
combines with standard O.Z. fittings for any terminating or splicing job involving INTERLOCKED ARMOR CABLE.

Seals cable ends to protect insulation against moisture and other contaminators—can also be used with threaded hubs and bosses to provide watertight cable entrances.



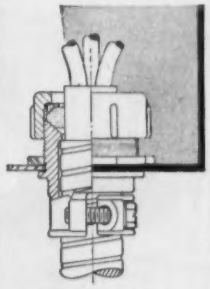
TYPE "PKC"

Terminator for interlocked armor cable entering bottom of cabinet.



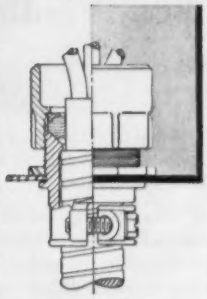
TYPE "PKT"

Terminator for interlocked armor cable entering top of cabinet.



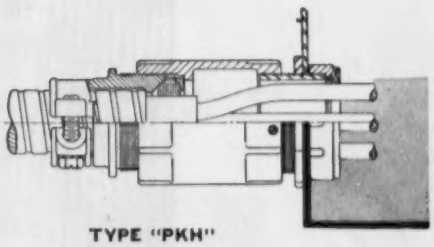
TYPE "PKG"

Sealing bushing for interlocked armor cable entering a cabinet.



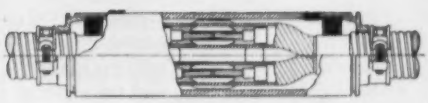
TYPE "PKF"

Compound bushing for interlocked armor cable entering bottom of cabinet.



TYPE "PKH"

Terminator for interlocked armor cable entering side of cabinet.



TYPE "PKS-J"

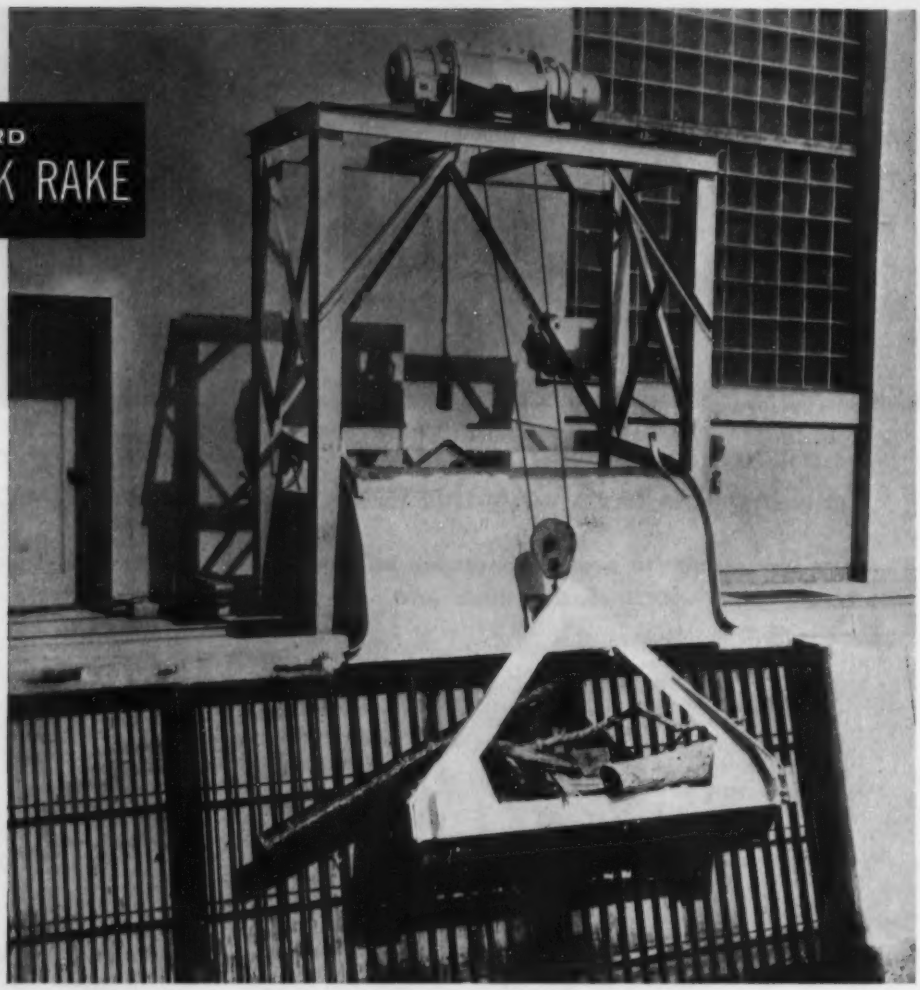
Splicing chamber for interlocked armor cable.

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND STREET • BROOKLYN 17, N. Y.

CAST IRON BOXES
CABLE TERMINATORS
POWER CONNECTORS
SOLDERLESS CONNECTORS
GROUNDING DEVICES
CONDUIT FITTINGS

LEONARD
TRASH RACK RAKE



NO GUIDES – better performance and greater economy

Leonard rakes operate without guides directly on trash rack bars . . . ride down over stubborn obstructions and work them loose. This freedom of movement assures fast, easy cleaning of the rack bars. No channel guides need be attached to bars or embedded in concrete piers. The initial cost is much less because the width of Leonard rakes can be kept to a minimum and the expense of guides eliminated.

Rake teeth parallel rack bars to clear debris and obstacles on descent, tilt to a perpendicular position when ascending and carry all extraneous matter to the unloading position. Operation is by an electric hoist on either inclined or vertical stationary rack bars.

For information on Leonard trash rack rakes and other accessories, as well as the design and manufacture of hydraulic turbines, write to S. Morgan Smith Company, York, Penna.

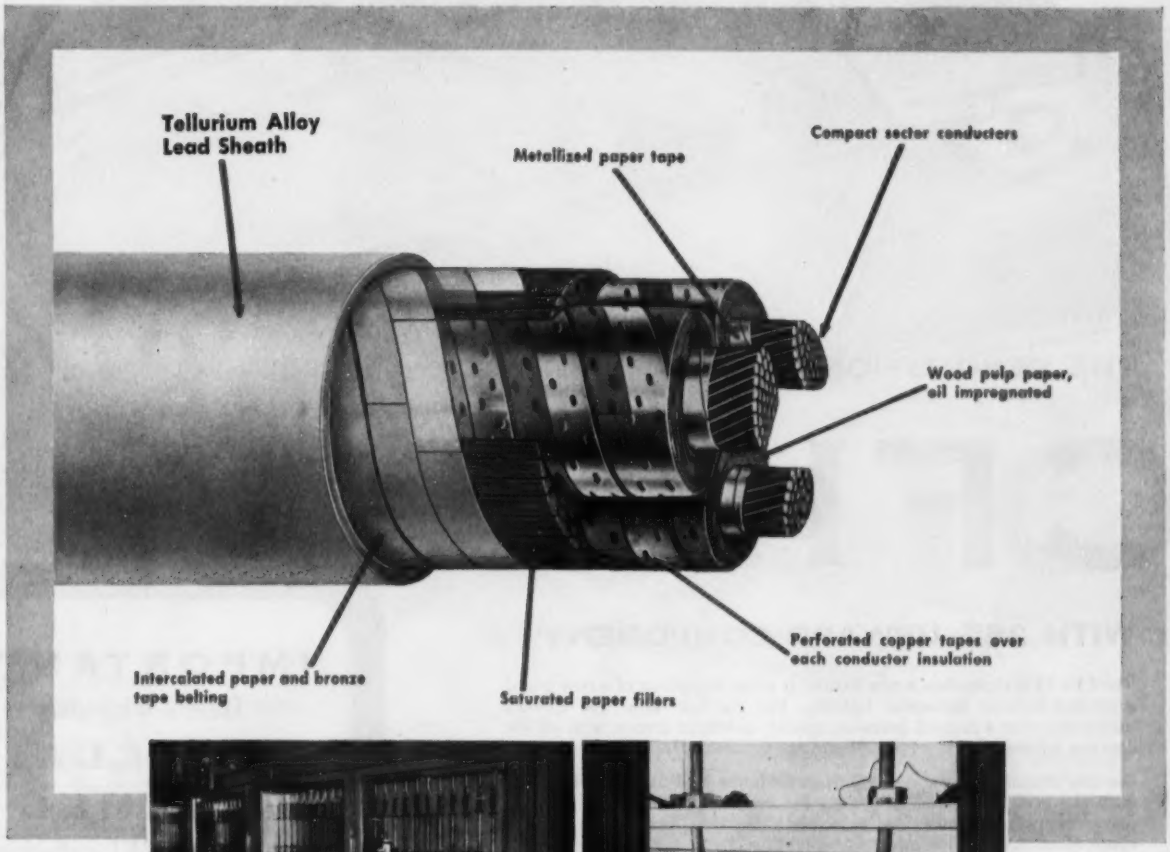
Hydraulic Turbines
Pumps
Gates & Hoists
Trash Rakes
Accessories

HYDRODYNAMICS

Rotovalves
Ball Valves
Butterfly Valves
Free-Discharge Valves
Controllable-Pitch Ship Propellers

S. MORGAN SMITH CO.

FOR INCREASED LOAD REQUIREMENTS...PAPER INSULATED CABLE WITH TELLURIUM ALLOY LEAD SHEATH


Tellurium Alloy Lead Sheath
Metallized paper tape
Compact sector conductors
Wood pulp paper, oil impregnated
Perforated copper tapes over each conductor insulation
Intercalated paper and bronze tape belting
Saturated paper fillers

Some of the specially-developed testing equipment with which Roebling maintains quality control of the production of Tellurium Alloy Lead Sheath. #1 Temperature control ovens for creep test of strips cut from tellurium alloy lead cable sheathing.. #2 Temperature control oven for bending fatigue test of full cable section.

YOU'LL REALLY solve power cable headaches with Roebling Paper Insulated Cable with the new Tellurium Alloy Lead Sheath*, a Roebling exclusive. Here are some of its outstanding advantages:

1–Tellurium Alloy Lead Sheathed Cable has a lower long-time creep rate;
2–Extra high fatigue resistance;
3–High bursting strength;
4–Exceptional stability under heat application as in duct splicing and wiping;
5–Abolishes need for frequent stop joints or reinforced lead sheath;
6–Doesn't require generous expansion bends or large manholes;
7–Heat application in splicing leaves its desirable properties unimpaired.

WRITE US FOR FULL DATA. John A. Roebling's Sons Corporation, Dept. 707, Trenton 2, N. J.

ROEBLING

SUBSIDIARY OF THE COLORADO FUEL AND IRON CORPORATION

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HGTS. BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, ROOM 239, HENRY W. OLIVER BLDG. • ROCHESTER, 1 FLINT ST. • ST. LOUIS, 3001 DELMAR BLVD. • SALT LAKE CITY, 536 W. 8TH SOUTH STREET • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

RECOMMENDED WHERE:

1. Seeing tasks demand 25 footcandles or more.
2. Walls, ceilings, machinery, etc., have good reflectance.
3. You need *super-comfortable* illumination.
4. Maintenance costs are important.
5. *Best* lighting is required at *reasonable* cost.

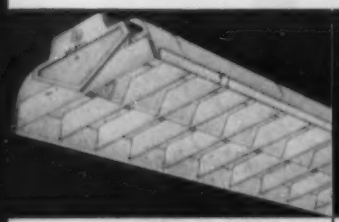
THE REVOLUTIONARY NEW LIFETIME

CFI-25

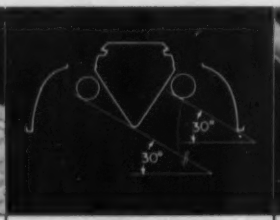
WITH 25% UPWARD COMPONENT

The CFI-25 is more than a new fixture. It is the beginning of a new era of super-comfortable industrial lighting. For the first time, the CFI-25 makes available a rugged, premium quality industrial fixture with all the comfort advantages of 25% uplighting—*within a practical price range!*

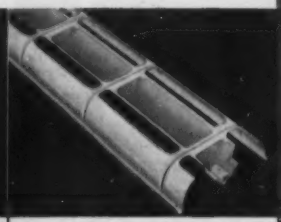
See this sensational new development. Compare it—feature for feature—with any other industrial fixture on the market. Notice the full 8-foot, one-piece, porcelain enameled reflectors... the new "bridge-type" ribbed construction... super-comfortable shielding... the many, many features that make the CFI-25 the most modern product in its field. Available for 8 ft. Slimline, 4 ft. Rapid Start and the newly developed 8 ft. High-Output Rapid Start lamps.



20° LENGTHWISE SHIELDING. Optional louver assembly provides excellent visual comfort. Louvers furnished in 4-ft. sections, hinge either side for easy servicing.



30° CROSSWISE SHIELDING. Porcelain reflector provides comfortable 30° crosswise shielding, adds substantial strength and rigidity to the fixture.



NEW RIBBED CONSTRUCTION. Reflectors reinforced by die-embossed ribs between apertures. Ribs add lateral stability, prevent spreading, maintain straight fixture edges.

IMPORTANT!

Here's why *only*

PORCELAIN ENAMEL

is used for CFI reflectors!

An industrial lighting fixture is no better than the wearing qualities of its reflecting surfaces. The lasting qualities of baked enamel reflectors are questionable in industrial applications. *Only porcelain enamel guarantees a lifetime of service at the least cost.*

Porcelain enamel does not decay or change with age because it is *inorganic*—nothing but rock-like minerals that are actually melted and fused to the base metal under extremely high temperature (1400-1600°). The result is a

CFI MEANS COMFORT FOR

CALL OR WRITE YOUR NEAREST DAY-BRITE REPRESENTATIVE FOR THE

THE NEW DAY-BRITE LIFETIME INDUSTRIAL SERIES— ONLY INDUSTRIALS WITH FULL 8-FOOT, ONE-PIECE, PORCELAIN ENAMELED REFLECTORS

THE LIFETIME

CFI-10

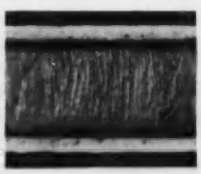
WITH 10% UPWARD COMPONENT

Sets a new high standard for industrial lighting fixtures! 10% uplighting reduces glare and lessens brightness contrasts. Full 8-foot, one-piece, porcelain enameled reflectors featuring new super-rigid ribbed construction. Runs line up perfectly, *stay perfect.* Available for 8 ft. Slimline, 4 ft. Rapid Start and the newly developed 8 ft. High-Output Rapid Start lamps. Engineered and built to give a *lifetime of service.*

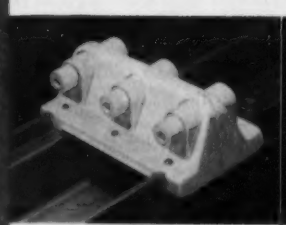
flint-hard, indestructible bond of metal and finish that is unaffected by time, heat, moisture and other harmful elements.

No baked enamel finish can assure you the non-yellowing, noncorrosive reflection surface that porcelain enamel does. There are no tiny surface pores in porcelain enamel. Any dirt or stain is external and is easily wiped away.

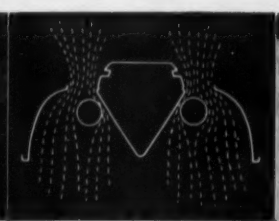
Because of its undisputed superiority, specially formulated porcelain enamel with a reflector factor of 85% or more is the one and only finish Day-Brite uses on the reflection surfaces of the CFI-25 and the CFI-10 ... to make them in fact — as well as in name — a *Lifetime* industrial lighting value.



Microphoto shows how metal and porcelain enamel fuse together to form lifetime bond.



SPRING-LOADED SOCKETS. Firm lamp contact, firm seating. Metal clad for positive alignment and protection against breakage. Individually replaceable.



COOLER, CLEANER OPERATION. Diagram demonstrates "up-draft" action through apertures. Constant flow of air keeps dust from settling, reduces operating temperature.

FAST, SIMPLE MAINTENANCE. Reflectors on or off in seconds, fasten to channel by hand-operated 2" wing-nuts. Porcelain enamel wipes clean quickly, is noncorrosive.

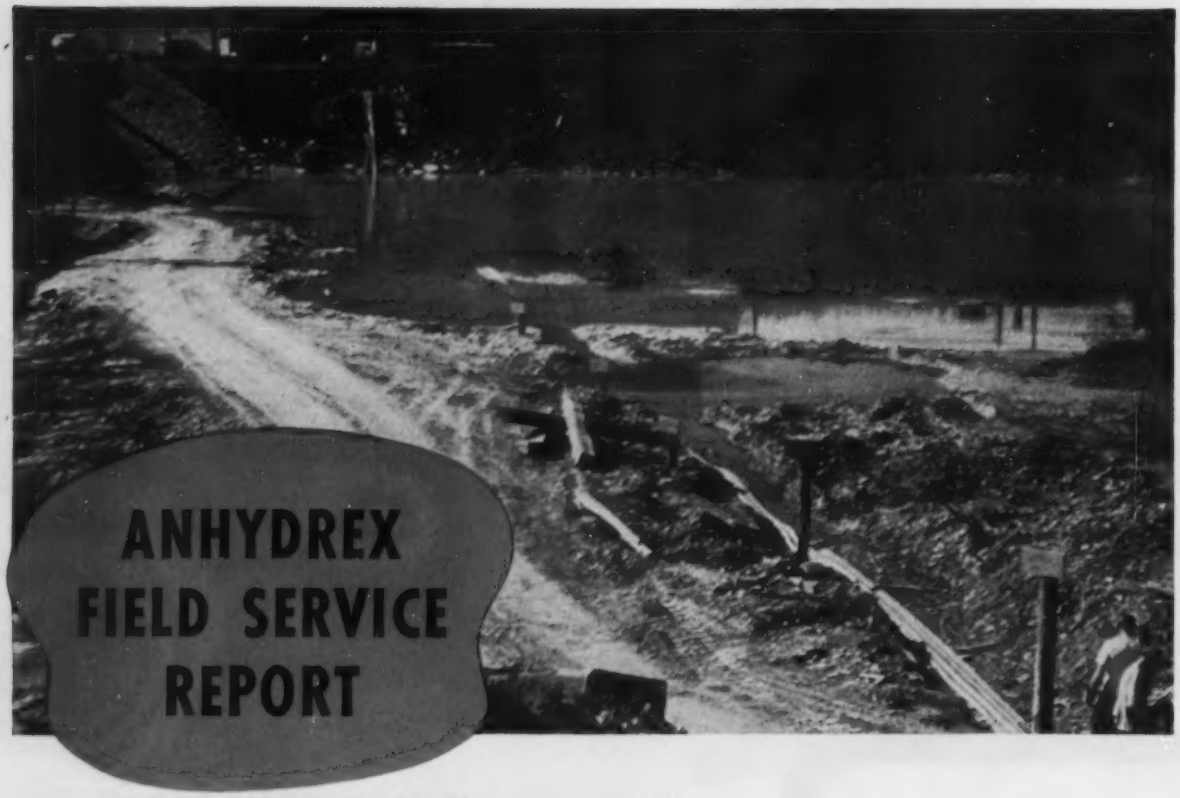
INDUSTRY!

COMPLETE QUALITY STORY

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Mo. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

4107



ANHYDREX FIELD SERVICE REPORT

PROBLEM: Maintaining uninterrupted electrical service during replacement of bridge and pole lines.

SOLUTION: Simplex Anhydrex-insulated, nonleaded, neoprene-jacketed Power Cables, protected by submarine-cable armor wire.

METHOD: A wire-rope messenger was strung across the 600-foot river and pulled taut between two line trucks. A steel snatch-block was arranged so that the sheave rode the messenger. Cable ends were attached to the block hook. Leader rope was also attached to the hook, and the cables pulled across with the sheave rolling on the messenger. A line truck winch supplied pulling power.

Cable ends were pulled into conduit on both river banks. They were terminated in potheads on one side, and spliced to existing circuits on the other side.

When the new bridge was finished, the cables were removed from the river bottom, armor wire was stripped off, and the cables were reinstalled in conduit on the bridge.

Simplex-Anhydrex is one of the most water-resistant electrical cable insulations made. It is guaranteed not to absorb more than 15 milligrams of water per square inch after 7 days at 158°F. *No Anhydrex-insulated cable has ever failed from water absorption.*

A post card to the address below will bring more information. No obligation, of course.

Simplex—ANHYDREX POWER CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

specify KUHLMAN for dependable power transformers

For more than half a century, Kuhlman Power Transformers have been providing a steady and dependable source of power for American utilities and industry. Built from finest quality materials and engineered for safe, economical operation, these units incorporate the latest design principles, many of which were developed by Kuhlman. Coils are dried under heat in vacuum to insure uniformly high insulation strength and then impregnated with thermosetting varnish to provide good mechanical strength. Insulation is coordinated to the basic impulse level. Windings are equipped with wide oil ducts for insulation and ample cooling. Oil is introduced under vacuum to prevent entrapment of air and insure high insulation strength. Construction throughout is sturdy and rigid. Structural steel core clamps hold the core securely in place to prevent shifting or vibration and provide support for coil braces, lead guides and terminal structures. Tanks are constructed of heavy steel plate, and sealed to minimize deterioration of oil.

Kuhlman Power Transformers are assembled by men who are highly skilled in the electrical crafts. They are thoroughly inspected and tested to meet rigid quality standards. Kuhlman Power Transformers can be produced in a wide variety of ratings, with accessories to suit the specific needs of utilities and industries. For complete information, write for Bulletin CS-601. Kuhlman also builds Distribution, Dry Type, Saf-T-Kuhl, Subway, CSP and Series Street Lighting Transformers. Bulletins are available on these models as well.

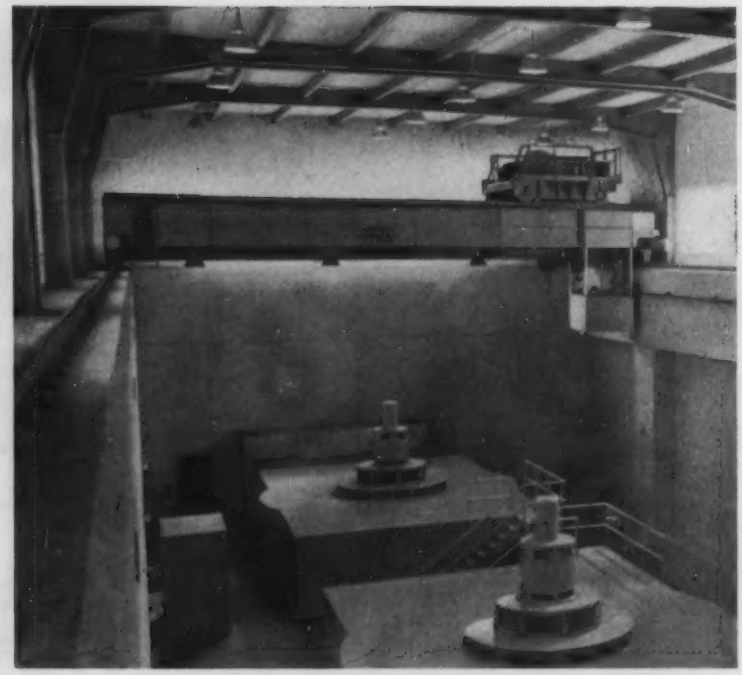
151-T

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

DISTRIBUTED BY MAYDWELL & HARTZELL, INC. • SEATTLE • SPOKANE • PORTLAND • SAN FRANCISCO • LOS ANGELES • PHOENIX

MOFFETT powerhouse crane, designed and installed at Tenkiller Dam, Oklahoma, for Corps of Engineers, U.S. Army. Main hoist, 75 tons. Auxiliary hoist, 15 tons. Span, 48½ feet. Lift, 49½ feet.



How to avoid headaches on overhead crane jobs—

Consult MOFFETT

CAPACITIES: 1/4 to 650 TONS

MOFFETT
"plant individualized"
cranes can be designed to solve almost any overhead materials handling problem.

Types include:

- continuous duty
- heavy industrial duty
- intermittent duty
- powerhouse
- standby
- steel mill
- gantry
- special purpose

Remember, whether it's a crane or a part, MOFFETT can build it for you. Call us NOW for consultation and quotations. No obligation.

When you contract with MOFFETT for an overhead crane, you can be sure the design will be "plant individualized" for your job...will be delivered when you're ready for it...and will be match marked so you can install it quickly and without confusion.

We're old hands at working with contractors, public utilities and governmental bodies...know and understand the importance of coordinating deliveries with your erection schedules. The engineers designing your crane work directly with you, so you avoid red tape and foul-ups. Result: you get a crane that fits into place exactly...contractors tell us MOFFETT cranes are the easiest to erect. And maintenance records show the user can count on long, trouble-free service.

MOFFETT ENGINEERING COMPANY

Traveling Cranes • Hoists

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10,000 Tons of Proof ... in the last three years alone, we have built cranes with an aggregate capacity of 10,000 tons for such leaders as:

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Pacific Gas & Electric Co.
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Announcing New, Re-Designed

Arktite

HEAVY DUTY

PLUGS & RECEPTACLES

NEW pressure connectors; no soldering unless you prefer to do it.

NEW easier-to-wire interior assembly; comes out in one piece—just remove 2 screws.

NEW easier-to-interchange plug and receptacle interiors; no machining; no special tools.

NEW plug adaptability; takes any size portable cable up to full 30 amp. capacity.

Circuit-Breaking Features Make Arktite Safe at Full Load Without Disconnect Switches

Each contact is insulated in a separate chamber. Arcs formed while making or breaking circuit are snuffed out in arcing chambers by pressure-deionization and lack of oxygen. No chance of flash-over even if break is made at full load. With grounding contacts longer than load contacts, plug and tool are grounded *before* circuit is made and *after* it is broken.

New *Arktites* now available in 30 amp. size — 2-pole, 3-pole and 4-pole styles. Fully interchangeable with old *Arktites* — *same economical price.*

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OR SEE YOUR CROUSE-HINDS DISTRIBUTOR.

A NATIONWIDE DISTRIBUTION exclusively through ELECTRICAL DISTRIBUTORS

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CONDULETS • FLOODLIGHTS • TRAFFIC SIGNALS • AIRPORT LIGHTING

Now...88% longer

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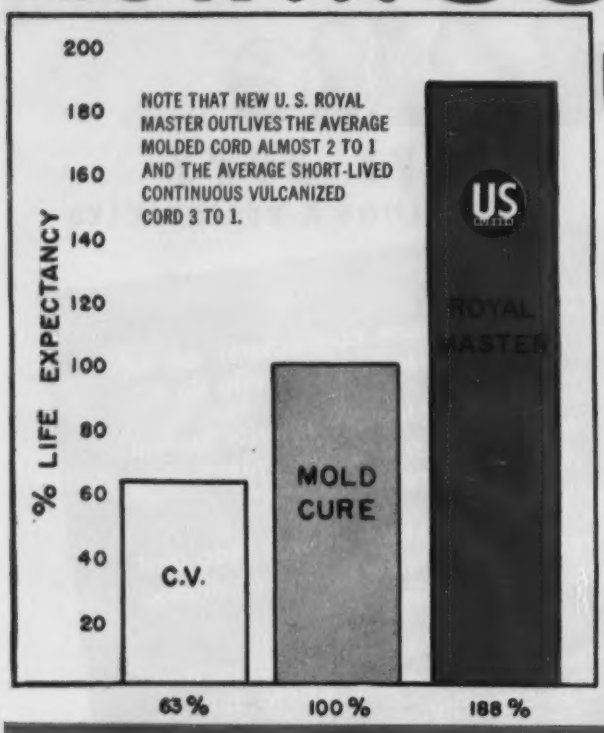

Chart—summarizing individual service factors weighted by their contribution to overall service life—shows new U. S. Royal Master Cord gives 88% longer life than the average of competitive molded cords.

LOOK FOR THE NAME—

U.S. ROYAL MASTER

Superior on every count!*

- 33.3% greater heat resistance
- 55.7% greater impact strength
- 53.8% greater abrasion resistance
- 30.6% greater resistance to cutting
- 110.3% greater resistance to tearing
- 21.2% greater tension or breaking strength
- 23.3% greater oil resistance
- 128.8% greater flexibility

*to the average of molded cords of other makes

US RUBBER

UNITED STATES

ELECTRICAL WIRE AND CABLE DEPARTMENT

cord life—with NEW MASTER portable cord!

Far outlasts *any* other cord made!

Service to cost ratings show new U. S. Royal Master Cord actually gives $1.88 in value for every cord dollar when compared to the average competitive molded cord!

Two years ago, "U. S." engineers began a *complete reexamination* of portable cord construction, service life, and the causes of cord failure.

Over 10,000 tests were made. More than a thousand cords of all leading makes, including our own famous U. S. Royal Cord, were analyzed, tested, and compared.

Every life factor was considered and carefully evaluated, alone and in its relation to overall cord performance and service life.

Backed by 64 years of experience in the manufacture of electrical wire and cable, U. S. Rubber engineers then translated their findings into an entirely new portable cord, designed to surpass any other previously made.

Extensive tests, both in the laboratory and in outside plant installations have proved this new portable cord startlingly superior in every respect!

New U. S. Royal Master is unquestionably the finest cord you can buy!

From every standpoint, new U. S. Royal Master is a finer, more durable cord—actually gives 88% longer life than the average of other molded cords—far longer than *any* other cord—surpassing even a *hypothetical* cord incorporating the best features of all those tested!

Far greater value, too! In spite of almost doubled service life, this great new cord is in the same price category as other molded cords—giving you $1.88 in cord value for every cord $1.00!

Prove to yourself the outstanding superiority of new U. S. Royal Master Portable Cord—in both service life *and* economy! Get in touch with your "U. S." distributor today!

Approved by Underwriters' Laboratories, Inc.

RUBBER COMPANY

ROCKEFELLER CENTER, NEW YORK 20, N. Y.

"...business helps itself by promoting thrift among its own people."

EDWARD C. BALTZ
President
Perpetual Building Association
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"Expanding the regular sales of U. S. Savings Bonds is essential to the continued success of our Government's sound money policy. Savings Bonds help people build security for themselves and stability for the nation's economy. A reserve in Bonds gives them the assurance to spend current income on homes, cars and other substantial purchases. Meanwhile, regular Bond buying goes on adding to their future buying power. Thus business helps itself by promoting thrift among its own people. The surest way to encourage an employee to save regularly right where he works is to sign him up on the Payroll Savings Plan."

Let's point up this statement by Mr. Baltz, head of one of the nation's outstanding thrift institutions and volunteer chairman of the District of Columbia Savings Bond Committee, with a few facts and figures:

- currently, more than 45,000 companies, large and small, representing every classification of industry and business, are encouraging national thrift through the Payroll Savings Plan.
- every month, 8,500,000 Payroll Savers in these 45,000 companies invest more than $160,000,000 in Savings Bonds.
- largely as the result of employer-encouraged thrift the cash value of Savings Bonds held by individuals on July 31, 1954, totaled more than 37.5 billion dollars.
- never before has America had such a reserve of future purchasing power.
- invested in America, these 37.5 billion dollars in Savings Bonds Dollars are a most effective check on inflation and a very important contribution to economic stability and a sound dollar.

A million new Payroll Savers by the end of 1954! That's the goal of those who believe that what is good for Americans is good for business. To do your part in reaching this objective, phone, wire or write today to Savings Bonds Division, U. S. Treasury Department, Washington, D, C. Your State Director, U. S. Treasury Department, will show you how easy it is to build a successful Payroll Savings Plan.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

ELECTRICAL WEST

Formed from the Osage River by the Bagnell Dam, the Lake of the Ozarks provides storage for the Osage Power Plant equipped with eight Allis-Chalmers Francis-type turbines. This power plant carries part of the peak loads on the Union Electric Company of Missouri's integrated electrical system serving territory in Missouri, Illinois and Iowa.

First There Were Six

In 1930 Union Electric installed six Allis-Chalmers turbines at the Osage Power Plant. These six hydraulic turbines have required no unusual maintenance of any kind and their operation has been completely satisfactory.

When two new turbines were added in 1953, they were also supplied by Allis-Chalmers. Rated 33,500 hp, 90-ft head, 112½ rpm, all eight units are of the Francis runner, vertical, plate steel casing type. Having provided cabinet-type governors for the new units, A-C is now modernizing the valves for the original six governors.

For half a century, Allis-Chalmers has been furnishing turbines, governors and auxiliaries for major installations of all types — propeller, Francis and impulse — in ratings up to 150,000 hp and 2500-ft heads. Write for Bulletins 01B7301 (turbines) and 05B7549 (generators). Allis-Chalmers, Milwaukee 1, Wisconsin, U. S. A.

A-4382

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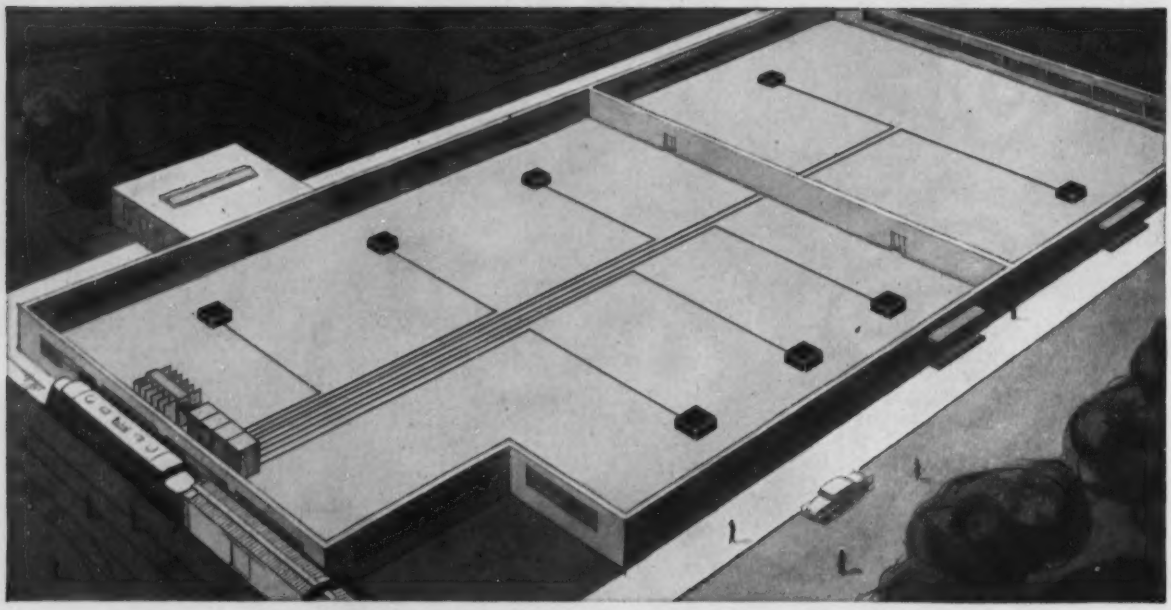
Manufacture

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

How G-E job-planned power systems can help maintain plant efficiency



WHEN INCREASING LOADS CALL FOR A NEW POWER DISTRIBUTION SYSTEM — G-E WIRE AND CABLE WILL GIVE IT THE VERSATILITY NEEDED FOR FUTURE EXPANSION.

The continuing development of new electrical equipment, processes, and materials handling methods doubles the use of electricity approximately every ten years — according to the findings of qualified authorities. This means that you may need a new or expanded distribution system to handle these greater loads efficiently — because the unstable voltages that result from overloads increase distribution and equipment maintenance costs, and result in outages, faulty operation of equipment, and interrupted production.

A General Electric job-planned cable system is designed and coordinated to maintain plant efficiency by accommodating growing and changing load requirements. And G-E cables will keep your installation costs to a minimum, too.

Here are some examples:

85 C Super Coronol* cable provides overload capacity

G-E Super Coronol cable's normal rating (85 C up to 15,000 volts) and its emergency rating (up to 115 C depending on voltage) give you reserve capacity for handling growing loads. This cable, used for lead-ins and cable feeders, can be buried directly in the ground or installed in conduit or ducts.

G-E interlocked armor cable system provides for changes in plant layout

G-E V-c interlocked armor cable primary or secondary feeder systems can be installed quickly, and can easily be expanded or relocated to accommodate changes in load patterns — because each circuit is a separate, flexible cable that needs no conduit. Planned G-E cable systems are of growing importance to an industrial plant, and can have a major effect on the plant's efficiency. So, when you have to handle increasing loads, let your G-E wire and cable specialist help you with the planning. For more information on G-E cable systems, write Section W127-1125, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Registered Trade-mark General Electric Company

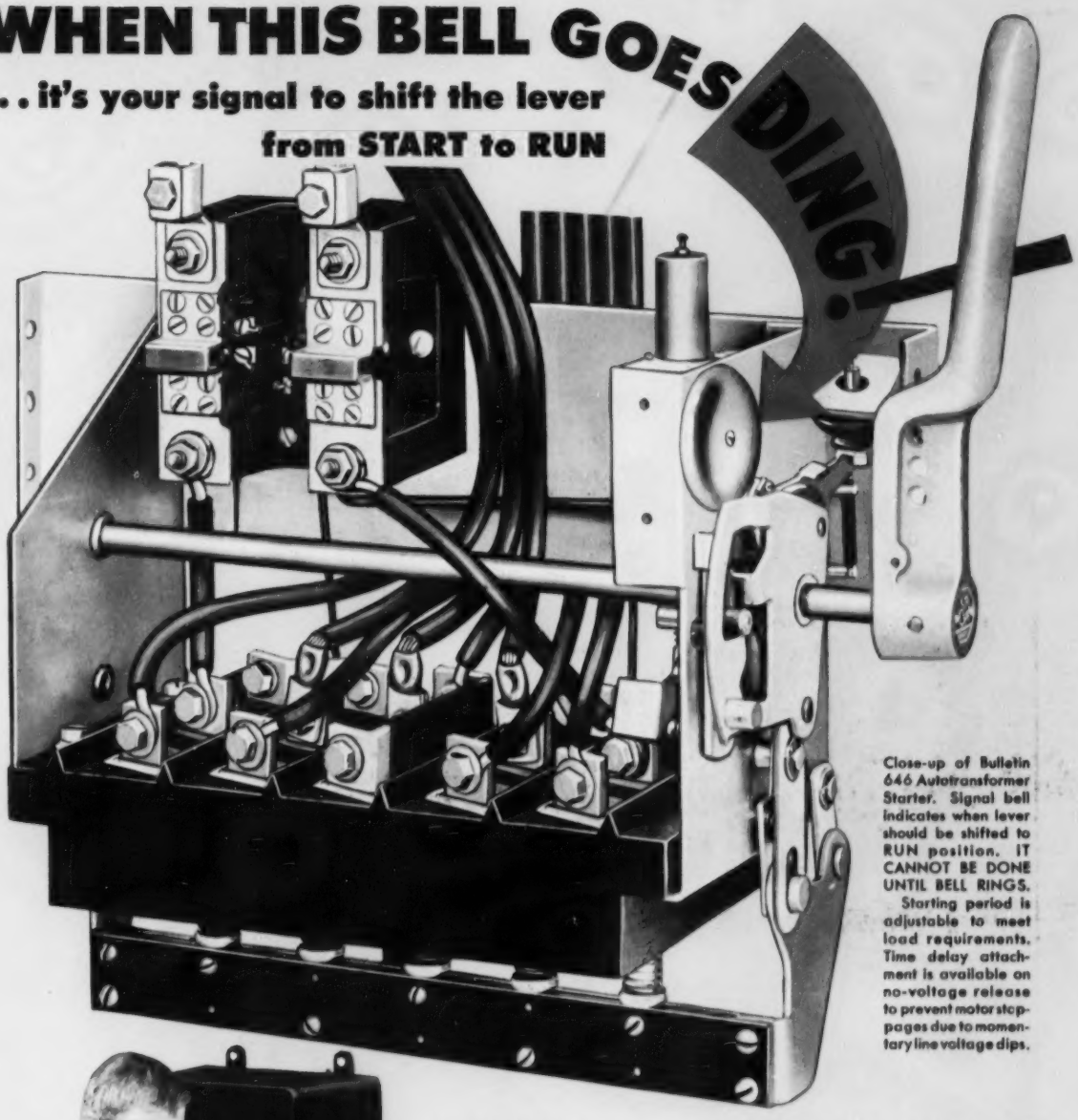
Progress Is Our Most Important Product

REWIRE AMERICA ... WITH GENERAL ELECTRIC WIRING SYSTEMS

GENERAL ELECTRIC

WHEN THIS BELL GOES DING!

. . . it's your signal to shift the lever from START to RUN



Close-up of Bulletin 646 Autotransformer Starter. Signal bell indicates when lever should be shifted to RUN position. IT CANNOT BE DONE UNTIL BELL RINGS.

Starting period is adjustable to meet load requirements. Time delay attachment is available on no-voltage release to prevent motor stoppages due to momentary line voltage dips.

Operator listening for signal bell which indicates when to throw lever into RUN position.

Air-break Contacts up to 75 HP, 220 V; 150 HP, 440-550 V

The outstanding feature of the Allen-Bradley Bulletin 646 Autotransformer Starter—in Sizes A, B, & C—is the use of silver alloy, air-break contacts. They do away with oil tanks and messy contact maintenance. Only the Size D starter—rated up to 250 hp, 440-550 v—requires oil-immersed contacts.

Send for Bulletin 646 giving complete details on this popular line of reduced voltage squirrel cage motor starters.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Limited, Galt, Ont.

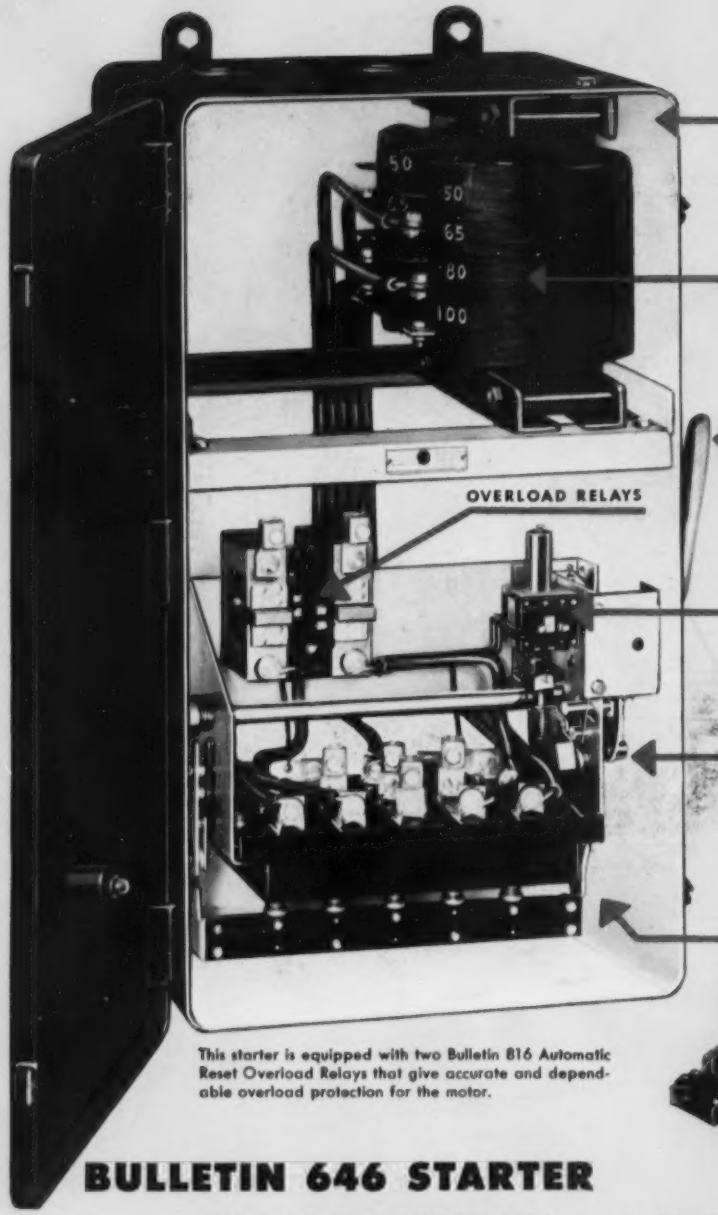
9-54-M

A-B Quality

ALLEN-BRADLEY

BULLETIN 646 AUTOTRANSFORMER STARTER

QUALITY



This starter is equipped with two Bulletin 816 Automatic Reset Overload Relays that give accurate and dependable overload protection for the motor.

ENCLOSURES WITH WHITE INTERIORS
White enameled inside walls of the starter cabinet reflect light on the switch mechanism, making installation and inspection easy even in dark plant locations.

THREE-PHASE AUTOTRANSFORMER
The double winding, open-Delta-connected 3-phase autotransformer has 50%, 65%, and 80% reduced voltage taps. Starting voltage can be easily adjusted to suit the load.

MANUAL OPERATING LEVER
The operating lever is mechanically interlocked with a simple latch which forces the operator to pull the lever into the START position before throwing it into RUN position.

MAGNETIC HOLD-IN LATCH
Contacts are held in the RUN position by a solenoid-operated latch which drops out in case of voltage failure and opens the starter contacts. Operator must restart the motor.

TIME DELAY SWITCHOVER
An adjustable vacuum cup can be set for any starting period from 0 to 15 seconds. Hand lever cannot be pushed into RUN position until the preset starting interval has elapsed.

DOUBLE BREAK, SILVER ALLOY CONTACTS
Here are shown the movable contact bar and the stationary contact block. The double break, silver alloy contacts have long, maintenance free life. No oil needed.

BULLETIN 646 STARTER

HAS AIR-BREAK CONTACTS up to 75 HP, 220 V; 150 HP, 440-550 V

GOOD NEWS . . . Bulletin 646 Autotransformer Starters are available with AIR-BREAK contacts in ratings up to 75 hp, 220 v; and 150 hp, 440-550 v. Only Size D starters require oil-immersed contacts for motors up to 250 hp. The oil-immersed construction can be supplied, however, in Sizes A, B, and C, but their use should be limited to the types of installations which require oil-immersed contacts.

The extraordinary advantage of air-break contacts accounts for the booming popularity of the Sizes A, B, and C starters in the Bulletin 646 line. The silver alloy contacts remain in good condition without filing, cleaning, or dressing. Send for Bulletin 646, which gives all the facts about these remarkable starters. They are the only modern starters of this type on the market.

ALLEN-BRADLEY
Quality
BULLETIN 646 AUTOTRANSFORMER STARTER

A-B Quality

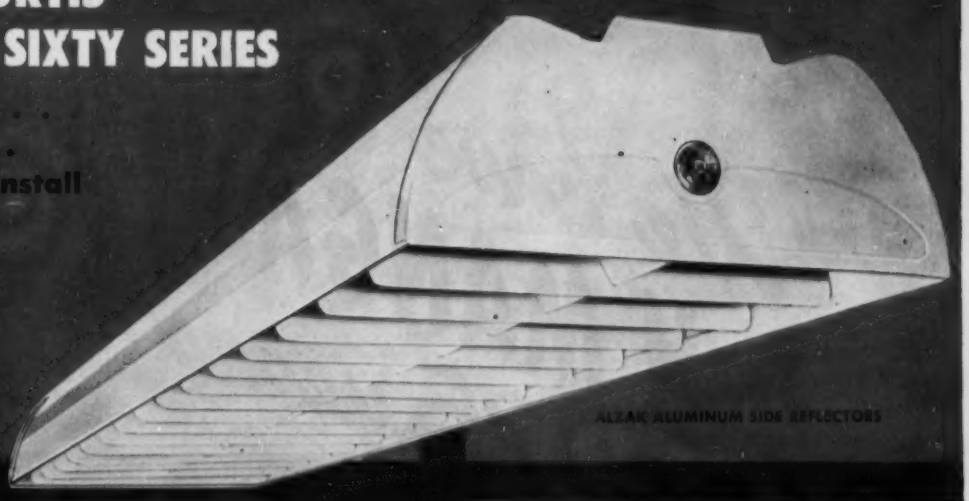
Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

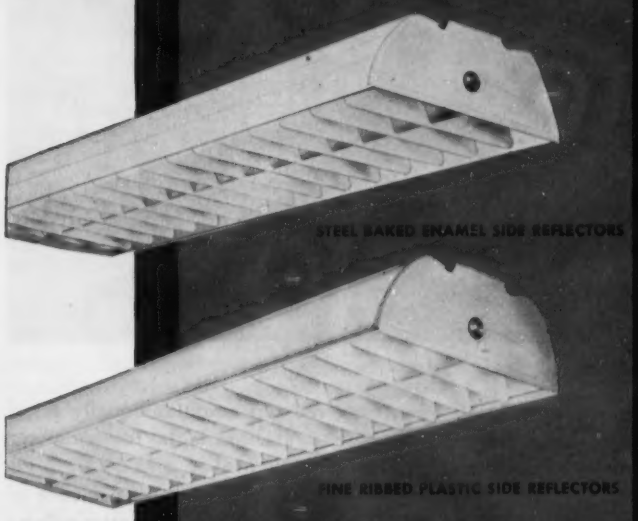
In Canada — Allen-Bradley Canada Limited, Galt, Ont.

9-54-M

NEW CURTIS FORTY-SIXTY SERIES

Shallower . . .
wider . . .
easier to install





NOW AVAILABLE
FOR ALL 4 - 5 AND 8 FOOT
RAPID START, SLIMLINE
STARTER AND LOW BRIGHTNESS LAMPS

America's most famous line of fluorescent luminaires has been redesigned to give you more than 100 separate and distinct units. The new Curtis Forty-Sixty Series provides excellent general illumination for schools, offices, stores and other commercial interiors. These low-brightness units direct 40% of the light upwards and 60% to the working plane. They also offer a choice of shielding angles for the direct component. Available with Alzak aluminum, steel baked-white enamel and plastic sides. Now, more than ever before, there is a Curtis Forty-Sixty applicable to your next lighting job.

TONG HANGERS

Curtis Tong Hangers facilitate and cut installation cost. Use of Tong Hangers allows considerable flexibility in placement of hangers and permits by-passing of building construction obstacles such as beams, sprinkler heads, etc.

Write for illustrated literature.

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CURTIS LIGHTING, INC.

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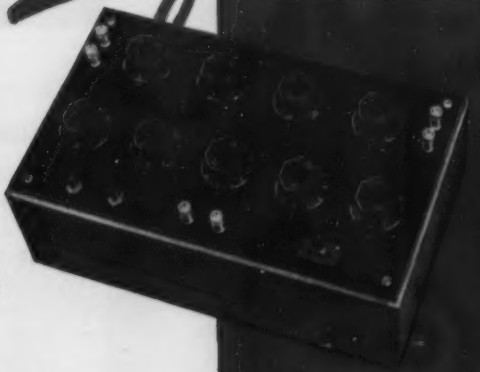
"We have used D-H MANGANIN for 25 years..."



DOUBLE-PURPOSE BRIDGE. This Shallcross Model 6320 Wheatstone Limit Bridge can be used both for exact resistance readings and, in production, for rapid checks on percent deviation from an accepted standard. Overall range extends from 0.1 ohms to 111,110,000 ohms. All resistors are D-H Manganin.

Says **SHALLCROSS MANUFACTURING COMPANY,** Collingdale, Pa.: "For 25 years we have been using Driver-Harris Manganin wire in the construction of Wheatstone and other precision bridges. In addition, D-H Manganin alloy has been used in many special standards for research and development laboratories. We feel that the quality of our products and the reputation of our instruments have been greatly enhanced by its use."

Behind statements like these stand Driver-Harris production and drawing techniques, which provide Manganin of such fixed stability that maximum change in resistance between 15°C and 35°C is only about 15 parts per million per degree centigrade—and frequently *less than one-third this* amount. Equally good electrical characteristics are available for ammeter shunt stock operating between 40°C and 60°C.

The experience of Shallcross reflects the experience of a host of manufacturers throughout the country; reflects what *you* can expect from Driver-Harris products, whether Manganin or any of the numerous alloys developed by Driver-Harris for application in the electrical and electronic fields.

Whatever your alloy problem, therefore, let us have your specifications. We'll gladly put at your disposal the skills acquired from 50 years of alloy manufacturing experience . . . make recommendations based on your specific needs.

*T. M. Reg. U. S. Pat. Off.

*Sole producers of world-famous Nichrome**

Driver-Harris Company

Western Representative: **ANGUS-CAMPBELL, INC.**

5320 Santa Fe Ave., Los Angeles 58 917 Bryant St., San Francisco 3

Main Office and Plant: HARRISON, NEW JERSEY

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

PRODUCT NEWS

Wound-Rotor Motor

(1) Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis.

This rib-type enclosed fan-cooled wound-rotor motor is made with slip rings, brushing rigging, rotor and stator inside a single-frame enclosure.

First A-C explosion-proof wound-rotor motor to bear the UL label, the new unit is available at 1,800 rpm and slower speeds in frames 284 to 505, in standard enclosed or explosion-proof construction.

In general the new motor is applicable where very low starting current, high starting torque, smooth acceleration, jogging or variable adjustable speed dictate use of a wound-rotor motor and where moist, dirty, corrosive or hazardous atmospheres require a totally enclosed motor, the manufacturer states.

The frame has an extended front end to include the slip rings, brushes and brush rigging in one enclosure. The elongation provides added surface for heat dispersal. Removal of two large pipe plugs from the upper quadrants of the frame on the slip-ring end provides large openings for maintenance work and adjustment of brushes and brush rigging. Slip-ring leads enter a separate cast-iron conduit box and the lead opening in the frame is sealed.

Leaflet 51R8195 gives details.

Insulation

(2) General Electric Co., Silicone Products Department, Pittsfield, Mass.

Capable of reducing processing problems common to other existing materials of this type, a new silicone rubber cable insulation is designated SE-965. The new rubber requires no milling, can be easily fed into extruding equipment, needs no oven baking and is low in cost compared with most silicone rubber compounds, the manufacturer states. It is said to have excellent shelf stability, good electrical properties. It can be tinted in various colors.

Having a finished surface that is smooth and glossy, the compound braids readily, with no oven cure. It is suitable for Navy cable and for general commercial applications for heat service up to 150 C.

Relatively inexpensive general-purpose silicone-insulated wire can be produced through the use of SE-965 for applications where temperatures of minus 65 and plus 300 F are encountered, it is stated.

Aluminum Clad Steel Wire

(3) Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.

Aluminum clad steel wire—ACSW—has been produced on an experimental basis and will be put into commercial production, according to the manufacturer. This new wire has been tested extensively in the field as the neutral in self-supporting service drops, it is reported, and is claimed to be well suited to this application because it can be readily wrapped around itself at terminal points. Possibilities are seen also for use in the communications and electric utilities fields.

Straight Line Clamps

(4) Porcelain Insulator Corp., Lima, N. Y.

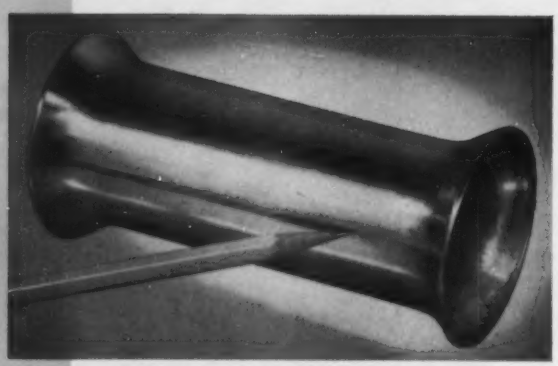
Easy blanketing and increased gripping surface on the conductor are principal advantages of a newly designed line of malleable iron straight line clamps, the manufacturer states. Another advantage listed is that the cable seat diameter of each clamp will accommodate a wider range of conductors, simplifying stocking.

Cable size ranges from .16 to .80 in. minimum and from .38 to 1.56 in. maximum. The larger clamps, L-4619, L-4620 and L-4621, will accommodate 1,750,000 CM copper conductor. The L-4609 light-weight, single U-bolt clamp is designed for small conductors (.16 to .38 in.) under light loadings. The clamp shown is L-4616 with cable seat diameter of .62 in. minimum to 1.25 in. maximum.

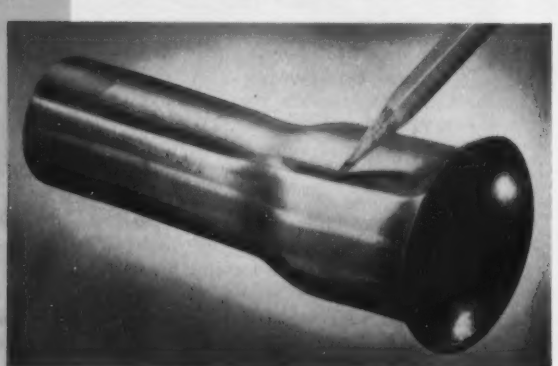
Ultimate strength ratings range from 7,000 lb for the L-4609 to 17,000 lb for the three larger clamps.

For additional information on these products fill in coupon on page 66

These punishing tests



Thousands of pounds of pressure were used to flare this piece of Rome • RIGID like a trumpet at both ends. Yet, note how the weld remains firm.



Despite expanding more than 25%, followed by flaring, the weld here again remains as sturdy as ever.

Smashing blows like those of a drop hammer have flattened this piece of Rome • RIGID. Yet they could not disturb its powerful electric weld.

Available in 10-foot straight lengths, as well as 90° elbows. Sizes range from ½" to 6". Fully approved by Underwriters' Laboratories, Inc.. Rome • RIGID meets all requirements for safe steel raceway . . . plus uniformly high quality. See your electrical wholesaler or call your nearest Rome Cable office today.

show why you get extra safety with Rome • RIGID steel conduit

The rigid conduit you install will never have to undergo tests any more severe than those put to these pieces of new Rome • RIGID.

Gruelling tests

Look at them. One has been flared like a trumpet at both ends. Another has been expanded more than 25%, then *flared*. Still another piece has been flattened by a force having the impact of a drop hammer.

Weld holds firm

Yet in all cases the weld holds firm. That is because Rome • RIGID is cold formed from shot blasted steel and electrically welded. In fact, it is the only rigid conduit in sizes ½" to 6" to be formed and welded in this way.

Advantages of electric welding

In addition to providing you with extra strength, the electric welding of Rome • RIGID also assures you uniformity of ductility, dimensions and concentricity.

Cleanest surface known

You'll find no oxidation and no scale on Rome • RIGID. The unique cold forming process eliminates these hazards often found with hot formed pipe.

Exceptional corrosion resistance

Perhaps, most important of all is the superior resistance to corrosion you get with Rome • RIGID. This is the only rigid steel conduit hot dip galvanized by Armco's patented Sendzimir process.

In this process the pipe is precisely heated, burning off all surface dirt, grease and scale. The surfaces are reduced to virgin metal, then cooled in the same atmosphere without ever coming in contact with the air.

The virgin clean surfaces are instantly coated with pure zinc inside and out. This uniform bond between bright, clean metal and molten zinc eliminates flux and assures years of safe, trouble-free service.

Easy to install

The Sendzimir process also provides uniformity of temper, plus easy fishing and pulling of wires.

Uniform diameters and careful threading assure simple connections, materially cutting installation time and costs.

Western Sales Offices:

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230 South 4th West

Los Angeles 22, Calif.
2510 South Malt Avenue

San Francisco 24, Calif.
1100 Selby Street

Seattle 4, Wash.
3430 Fourth Ave., So.

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Corporation
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

ROME CABLE ROME, N.Y.

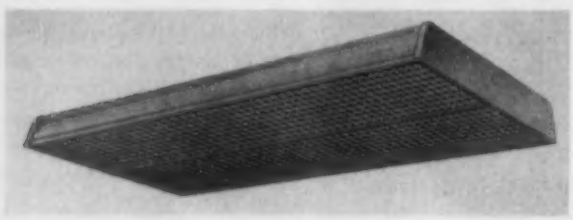
Industrial Fixture

(5) Day-Brite Lighting Inc., 5411 Bulwer Ave., St. Louis 7, Mo.

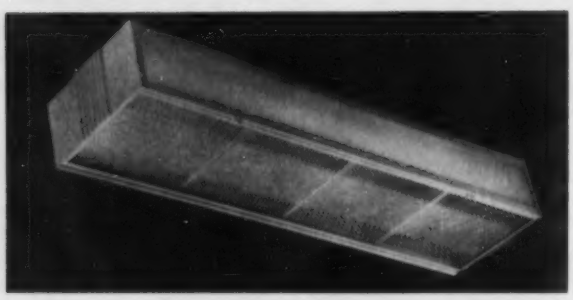
The new Lifetime CFI-25 industrial lighting fixture has 25% uplighting; is made of white porcelain enamel. It has full 8-ft reflectors, making fewer pieces to handle during installation and fewer joints. Reflection factor is 85% or more.

Apertures are die-embossed and new ribbed construction reinforces lateral strength to prevent the reflector from spreading. A longitudinal V center louver gives 30° crosswise shielding and reinforces lengthwise rigidity. The unit is recommended by the manufacturer with hinged louver assembly but is available without it.

Also offered in the Lifetime CFI series is the CFI-10 with 10% uplighting.

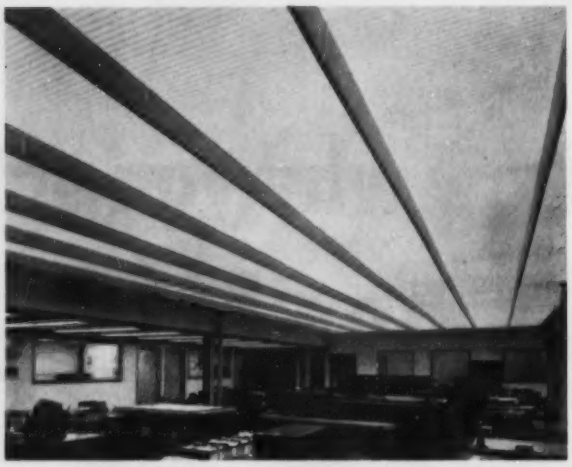


(6) STORE LIGHTING—A new group of fluorescent lighting fixtures for stores has been announced by The Miller Co., Meriden, Conn. According to the manufacturer, the needs of nearly all types of stores are filled by three types of fixtures, all using the rapid start F lamp. Designed by Phillip Johnson, these Storelites include the Merchant (shown) in two- and four-lamp, 48 in.; the Suburban in two- and four-lamp, 24 and 48 in., with full one-piece plastic body and aluminum ends; the Supermarketer, a bare lamp type, in two- and four-lamp, 48 and 96 in.

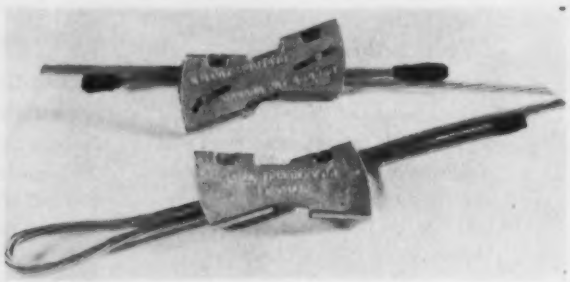


(7) LUMINAIRE—The Sunbeam 1060 series is designed around the low-brightness Holophane lens. The fixture is completely enclosed. It is versatile in its application, the manufacturer states, being adaptable to a small office, if it is running parallel with the normal line of view; to merchandising areas, where it is used with its matching spot; where a fixture is to be mounted on the bottom of an existing beam or between beams; for low ceilings where ceiling mounting with maximum light on ceiling is desired. A catalog is available from Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif.

For Additional Information on These Products Fill in Coupon on Page 66



(8) WALL-TO-WALL—A new system of wall-to-wall lighting, the Sylvan-Aire, incorporates light and sound control. A continuous corrugated white plastic ceiling is the source of soft, overall lighting. Through the use of spaced V-shape Sono-Wedges lined with thick glass-fiber pads, noise is deadened and disturbing sounds are reduced to comfortable levels, it is stated. Designed for areas where the ceiling is cluttered with service devices, the system permits quick access to these facilities. Two mounting systems are available, Uni-spaced and the Vari-spaced suspension. The sound control is optional equipment and may be added to the system after it has been installed. Available from Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.



Roller-Grip Clamp

(9) Paul S. Everley Co., 550 Ninth St., San Francisco 3, Calif.

A new type roller-grip clamp for guy strand, ropes, cables and rods. According to the manufacturer, it grips cable automatically, will not slip, holds beyond breaking strength of cable and can be used again and again. Two halves of clamp are easily disassembled for placing cable in clamp and slack may be pulled easily in grip by simply applying tension to pigtail end, it is stated.

(10) TESTING SYSTEM—An electronic testing system that will permit engineers to estimate the effect of the addition of new equipment to an industrial operation without test-installing it has been announced by the Industrial Division, Minneapolis-Honeywell Regulation Co., Wayne and Windrim Ave., Philadelphia. Known as a servo analyzer, it automatically translates behavior characteristics of equipment to a chart record. This is analyzed to determine how such a component will affect over-all behavior of the operation

General Electric announces
A COMPLETELY NEW LINE OF ENCLOSED FUSE CUTOUTS
ONE BASIC DESIGN OFFERS NEW ECONOMIES
. . . SATISFIES EVERY STANDARD NEED
GENERAL ELECTRIC

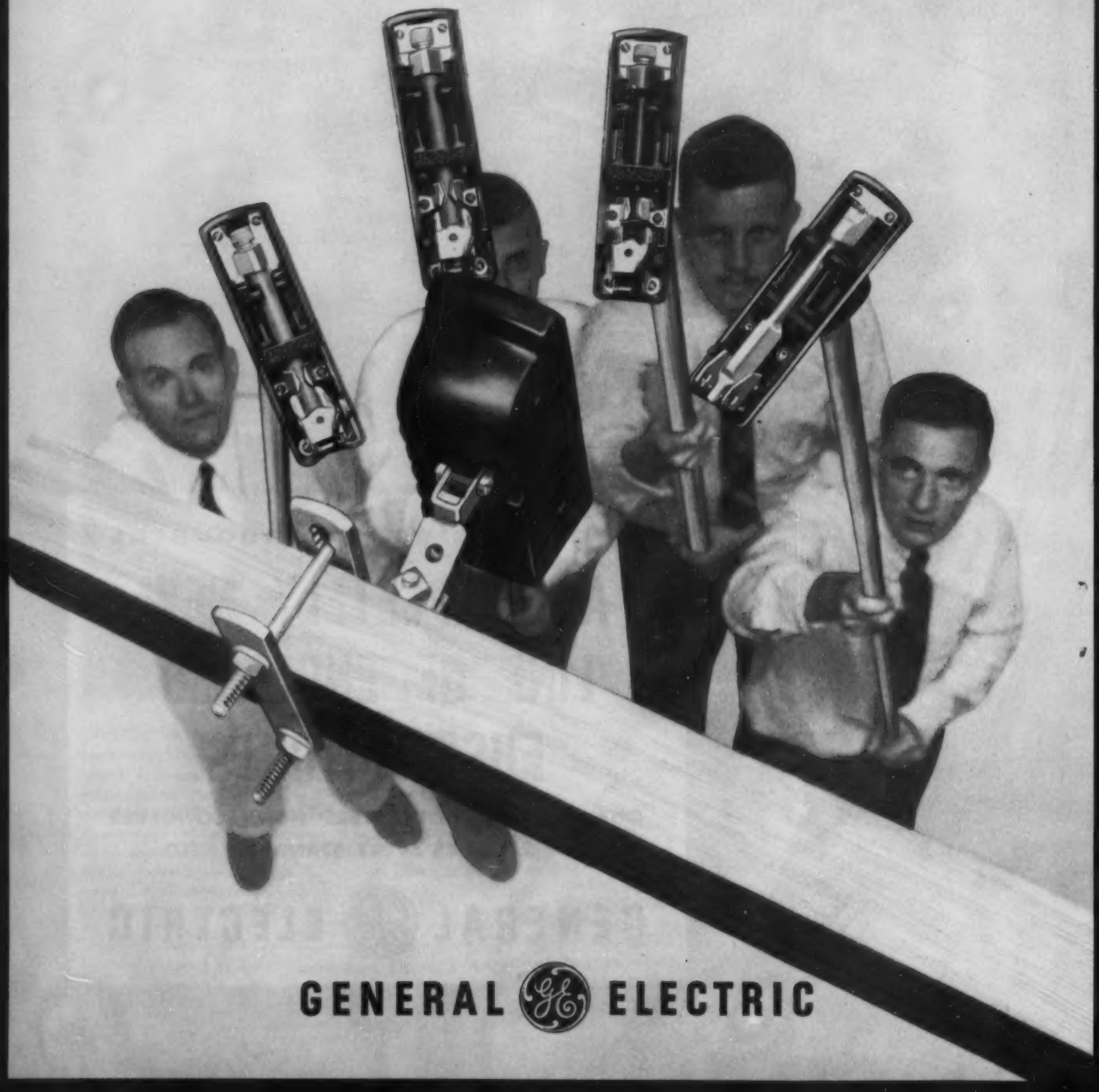
ONE BASIC DESIGN COMBINES ALL

NORMAL-DUTY, INDICATING OR DROPOUT DOOR can be easily converted on-the-job from semaphore indication of blown fuse to dropout action of door after blown fuse, by the simple removal of converting bar.

NORMAL-DUTY INDICATING NON-DROPOUT DOOR. Semaphore provides positive visual indication of blown fuse and is specifically designed for those users who desire the *non*-dropout operation—in which the door remains closed after a blown fuse.

HEAVY-DUTY DOOR, (or extra-heavy-duty door) is indicating non-dropout type. It is particularly applicable at system locations where high or extra-high short-circuit currents can occur.

DISCONNECT DOOR with hinged blade, has continuous current rating double that of standard fuseholder door—combines maximum safety with ready accessibility.



GENERAL ELECTRIC

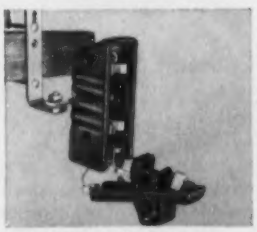
STANDARD FUSE CUTOUT FUNCTIONS

General Electric's new line of enclosed fuse cutouts is the most important cutout development since G.E. first introduced the family concept in 1935. Besides the functional advantages described on the opposite page, the new G-E enclosed fuse cutout gives you all the features most engineers and linemen have wanted. G-E sales engineers and specialists collected hundreds of reports about the things users preferred most. These user preferences were carefully analyzed and built into the new cutout before its design was approved.

Currently available in ratings of 50 amperes, 5.2 and 7.8 kv, this new line will soon include a 100 ampere rating in both voltage classes. For more information get in touch with your nearest G-E Apparatus Sales Office or Agent. Or write for Bulletin GEA-6208 to General Electric Company, Section 433–7, Schenectady 5, New York.

New General Electric cutouts have the features engineers and linemen prefer

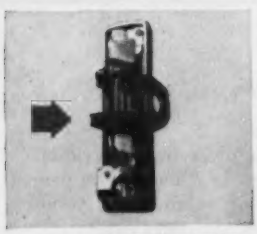
ENGINEERS PREFER:



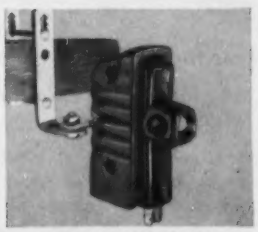
CONVERTIBLE-IN-THE-FIELD FROM INDICATING NON-DROP-OUT TO DROPOUT

COMPRESSION CLAMPING OF HANGER SUPPORT GIVES MAXIMUM MECHANICAL STRENGTH

V-WEDGE CONTACTS COMBINE ALL THE REQUIREMENTS FOR LONG SERVICE LIFE



SNUG FITTING NEOPRENE BARRIER HELPS PROTECT AGAINST INTERNAL FLASHOVERS



FLIP-OUT SEMAPHORE GIVES CLEAR INDICATION OF BLOWN FUSE

LINEMEN PREFER:

SAFETY GRIP DOOR FOR FUMBLEPROOF HANDLING WITH CONVENTIONAL SWITCH-STICK OR GLOVED HAND

PLASTIC TO METAL LATCHING BANISHES DOOR BINDING

FUSING IS EASY

EASY TO CONNECT

HINGED DISCONNECT BLADE GIVES VISUAL INDICATION OF OPEN OR CLOSED CIRCUIT

CAN'T MISS CLOSING OF DOOR

Connector

(11) Burndy Engineering Co. Inc., Norwalk, Conn.

A protective vinylite covering is a feature of this flexible braid connector. The insulated connector is made of extra-flexible flat tinned copper braid with seamless copper ferrules on each end; provides protection against corrosive atmosphere and abrasive particles. The entire braid section is covered with vinylite and secured within the ferrules by compression. The manufacturer states that the new connector is especially suited to plating operation applications.

Power Cable

(12) Rome Cable Corp., Rome, N.Y.

Designed for 5,000-v power feeder service, a new type of nonmetallic sheathed cable uses polyethylene insulating compound and a polyvinyl-chloride sheath to reduce diameter and weight. These compounds also give superior resistance to chemicals, moisture and mechanical damage and wear, it is pointed out.

The cable has three conductors, each individually shielded throughout its entire length with a metallic shielding. Ground wires, having a total cross section of at least 90% of the area of one conductor, are placed in the interstices in contact with the shielding on the individual conductors. Fillers are used to round out the core assembly. The core is taped and then covered with a tough exterior jacket of the manufacturer's Synthinol. This construction is said to offer the most in protection to personnel and against lightning.

This cable is available in sizes ranging from No. 6 AWG to 250 MCM. The No. 6 AWG cable, with a rated capacity of 72 amp, is 1.22 in. in diameter and weighs 895 lb per 1,000 ft. The 250 MCM cable is 2.21 in. in diameter, is rated at 271 amp and weighs 4,535 lb per 1,000 ft.

For Additional Information
Fill in the Coupon on Page 66

Gaff Gage

(13) Mathias Klein & Sons, 7200 McCormick Rd., Chicago 45, Ill.

A new precision gage permits the lineman to make a quick safety check on correct gaff thickness and width, its manufacturer reports. It is made of plated hardened steel and is packed in a durable plastic case with instructions and information on sharpening gaffs and testing for proper sharpness. It is designated KG 1 gaff gage.

Cathodic Protection Cables

(14) Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

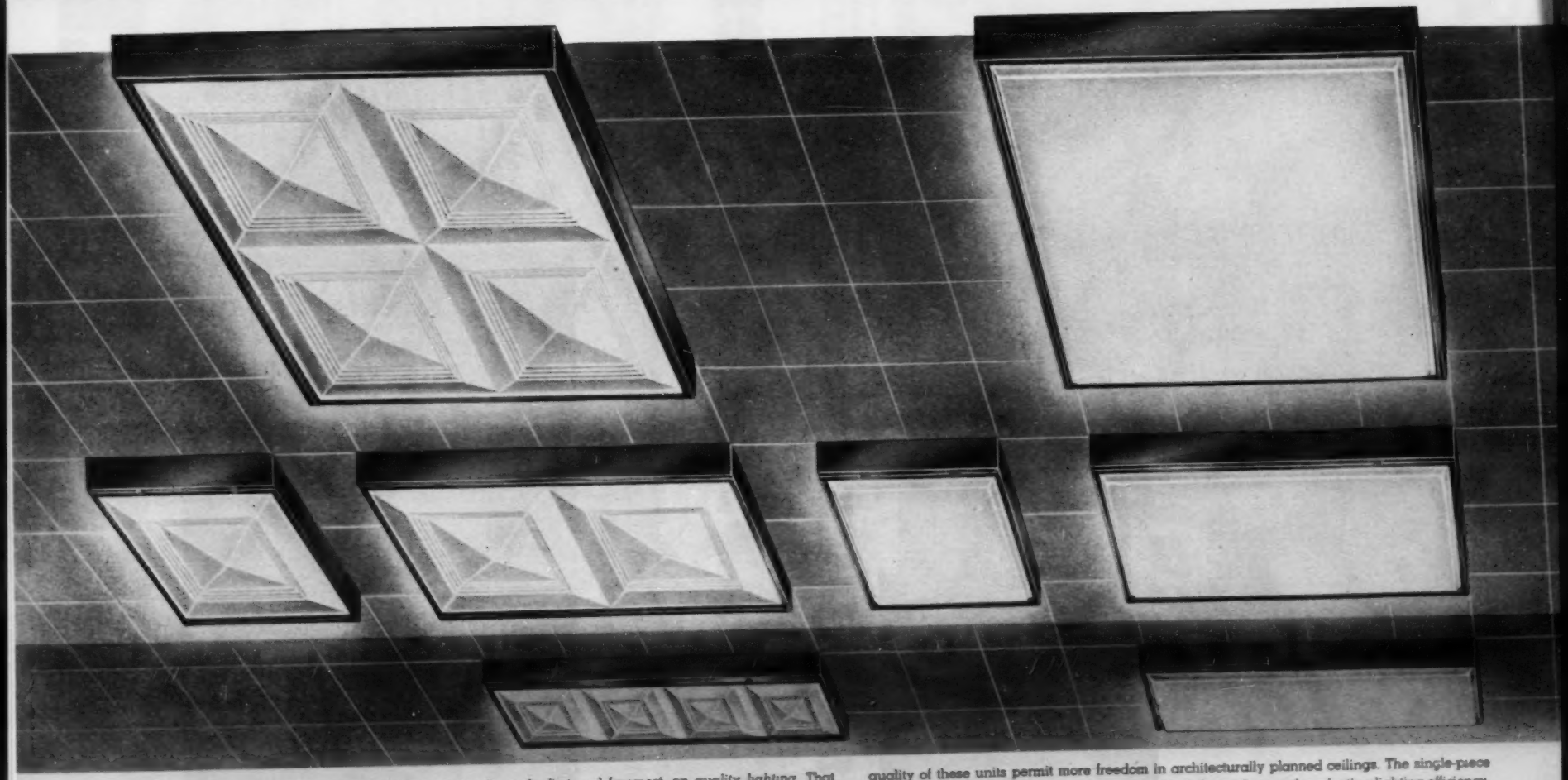
Recently introduced, the type CP direct burial cable, when used in the cathodic protection equipment, is claimed to be effective in preventing corrosion. The CP cables are available in sizes No. 8 through 4/0, single conductor, 600 v and can be either a rubber-neoprene construction (the manufacturer's Durasheath) or all-plastic polyethylene insulation and red PVC jacket (the new type CP).

Entrance Cable

(15) Triangle Conduit & Cable Co. Inc., New Brunswick, N. J.

Service entrance cable with a silver finish is claimed to have advantages of cleanliness in handling, appearance and ease in stripping. The finish is an added protection against weather. Outer braid of glass and cotton prevents festooning. This cable comes in popular sizes No. 10 through No. 2 in SE-ABN and SE-UBN types.

WHAT'S YOUR CHOICE?

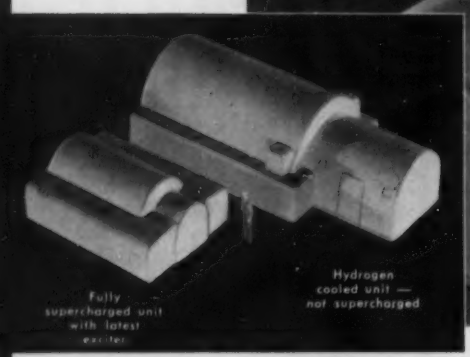


We know that your choice depends, first and foremost, on *quality lighting*. That is why Sunbeam Lighting fixtures are constantly engineered for greater quality. Knowing that your choice also depends on a choice, Sunbeam Lighting offers an extensive selection of modern, commercial luminaires each designed to do a specific lighting job. Now you may wish to choose Sunbeam's new, "large area," Plexiglas shielded, surface-mounted units for soft, low brightness, efficient illumination in stores, offices, banks and other commercial areas. The modular quality of these units permit more freedom in architecturally planned ceilings. The single-piece diffusers are molded from translucent white Plexiglas and assure long-lasting lighting efficiency. You have a choice of either smooth, "dropped" panels or geometrically designed panels for textural effects. Shallow in appearance, these new units are finished in standard white enamel which blends with most ceilings.

4 x 4 feet are #4800, 2 x 4 feet are #4600, 1 x 4 feet are #6600.

Let us know what your choice is and we will gladly send more information.

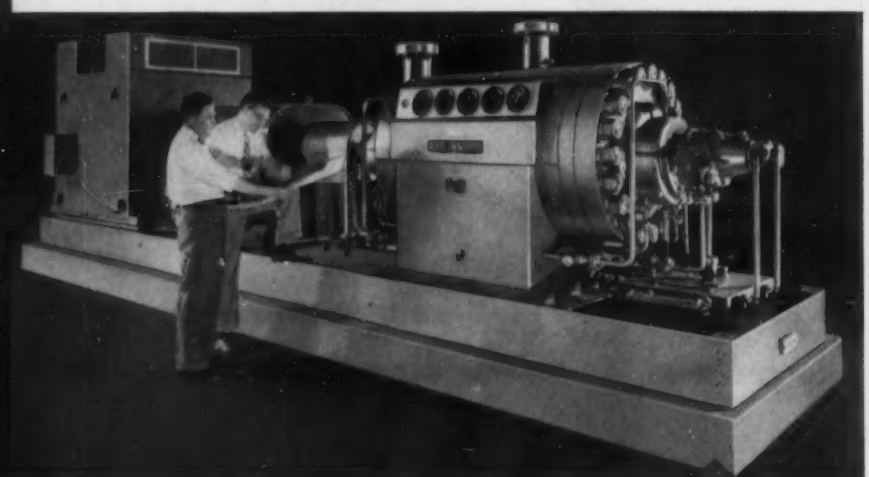
SUNBEAM LIGHTING COMPANY, 777 EAST 14TH PLACE, LOS ANGELES 21, CALIFORNIA



Supercharged Hydrogen Cooling! The first trend-setting rotor supercharged steam turbine generator unit established availability record of 99.86% during first two calendar years. Models of generators at left clearly show relative size reduction obtainable with fully supercharged cooling.

ALLIS-CHALMERS
Utility Equipment

Here are just a few of the many developments introduced by Allis-Chalmers in the last few years for the fast-moving utility industry. For information on any of these items call your nearby A-C office or write Allis-Chalmers, Milwaukee 1, Wisconsin.



Developments in Motors and Pumps for Boiler Feed Service

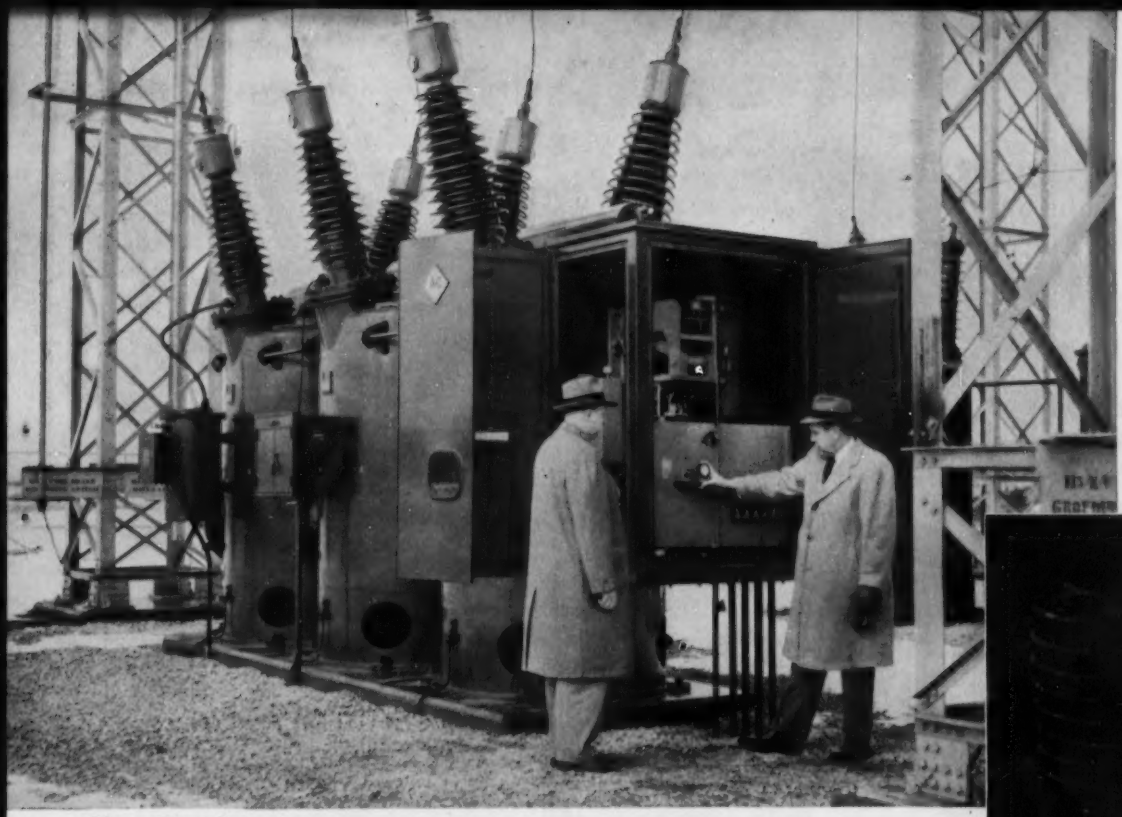
Redesigned Two-Pole Motor — Top air intake and discharge *plus* spiral stator core ventilation are now featured. Top air discharge permits closer mounting of motors. Spiral ventilation assures even internal cooling... helps reduce noise. In addition, motor has modern appearance and new capsule-type bearings are provided.

Latest Boiler Feed Pump — Recent refinements include simplified oil piping arrangement and lagging around barrel to permit insulation of barrel and provide improved appearance. Pump is barrel-type for high efficiency, high pressure service. Single stage back-to-back impellers balance axial forces without use of balancing drum. Double volute casings balance radial forces.

Pneu-Draulic is an Allis-Chalmers trademark.

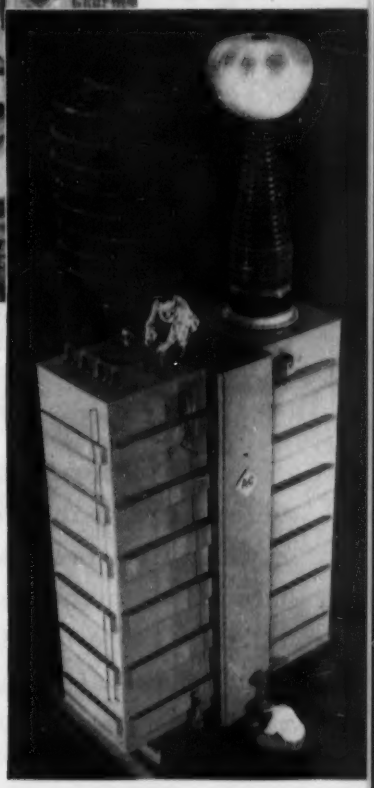
A-C ALLIS-CHALMERS

ALLIS-

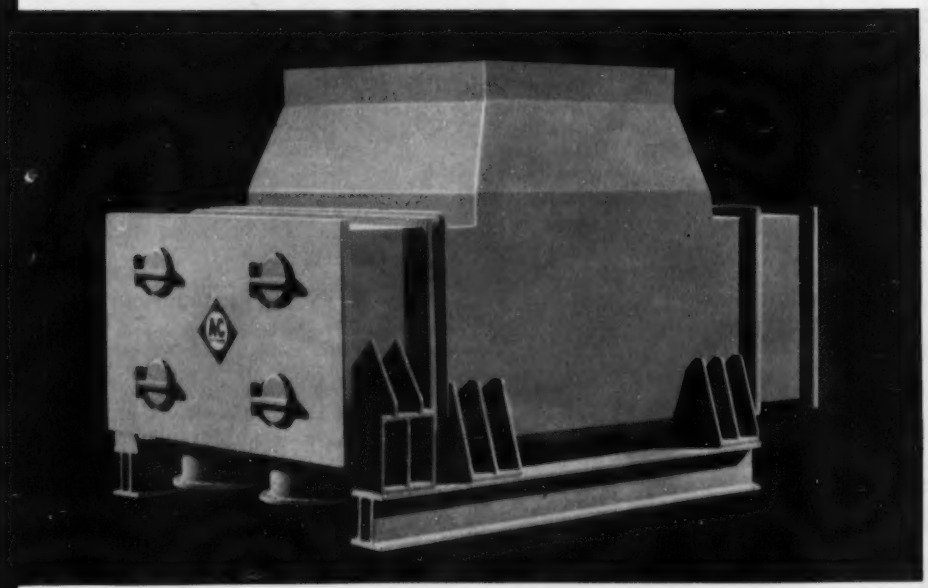


New Simplicity! *Pneu-Draulic* operating mechanism for breakers utilizes hydraulic principle instead of air. This reduces dirt and moisture hazards, adds reliability to breakers. These 115-kv breakers with *Pneu-Draulic* operators have been in service more than a year.

Developments



A Look At Tomorrow! This 5000-kva power transformer, designed for 600 or 800-kv service, was built to help advance engineering knowledge toward possible future requirements.

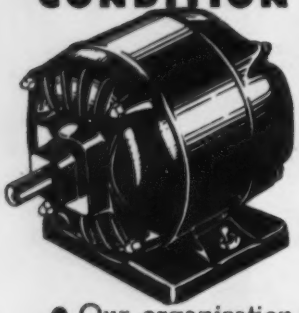


Space-Saving Condenser! Latest 100,000-square-foot condenser, now being built, illustrates trend to rectangular shape, which permits savings in plant construction cost. Model allows unusual view of unit. This condenser features multi-steam path design for low "terminal difference," high condensate temperature and low absolute pressure.

A-4484

CHALMERS

OHIO MOTOR AND GENERATOR BRUSHES
KEEP
YOUR MOTOR IN
Tip Top
CONDITION



• Our organization develops and manufactures brushes from raw materials thru to the finished product. Although we carry standard items in stock, for your convenience we also maintain a complete engineering staff to assist you in the selection and application of correct brushes for your equipment. We base our 37 years of reputable existence upon our SERVICE to INDUSTRY.

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St.
Los Angeles 13, Cal.

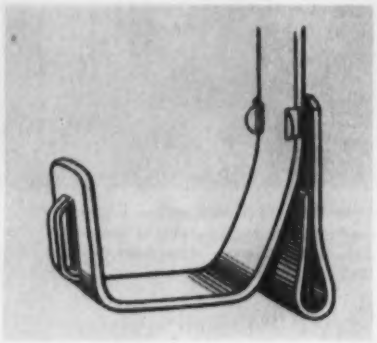
THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

Safety Switch

(16) Federal Pacific Electric Co., 50 Paris St., Newark, N.J.

A 200-amp type D safety switch, companion to the new 100-amp switch, is the latest in the manufacturer's Noark fuse line. The new switches are side operated and feature an unusually quick break and accelerated make, it is stated. Other features are visible blade construction, ample gutter space on each side for easy and neat wiring, new patented fuse holder and optional use of solder or crimp-type lugs.

The new switches are designed for residential and commercial applications such as lighting and appliance loads.



Gaff Guard

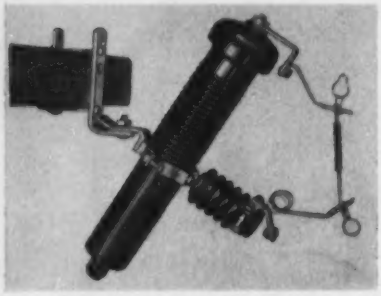
(17) Mathias Klein & Sons, 7200 McCormick Road, Chicago 45, Ill.

The 1901 MG clip-on gaff guard is designed to protect spurs on climbers when not in use and to safeguard other equipment in the lineman's tool kit. It is made of first-quality leather, firmly riveted. Rustproof stainless steel spring clip holds gaff guard to climber shank. A stop piece of rigid fiber prevents gaff from penetrating guard.

Aluminum Welding Electrode

(18) Aluminum Co. of America, 738 Alcoa Bldg., Pittsburgh 19, Pa.

A new welding electrode has been designed to give maximum weld quality in the inert-gas shielded arc welding of aluminum. It is for use in welding guns employed with existing consumable electrode, shielded arc processes and can also be used for tungsten-arc welding where the filler wire is fed mechanically to the work. The new I. G. electrode is being produced from three aluminum alloys—2S, 43S and A54S.

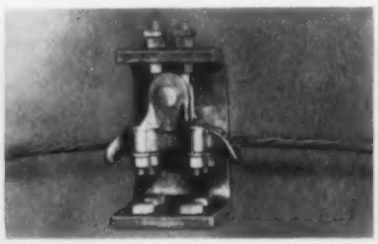


Arrester-Cutout Device

(19) Line Material Co., Milwaukee 1, Wis.

A combined arrester-cutout device designed for economical protection of rural transformers consists of a type D valve arrester and an open-link STF fuse cutout. The combination device has a single mounting bracket for crossarm or transformer mounting.

This device has a low impulse sparkover and low IR drop; is a porcelain-housed unit that gives all features of the manufacturer's type E valve arrester, including the isolator. It is available in three ratings: 9-kv arrester with 7.8-kv cutout; 10-kv arrester with 7.8-kv cutout; 15-kv arrester with 15-kv cutout. The device is angle mounted to facilitate re-fusing the cutout.



Ground Wire Bracket

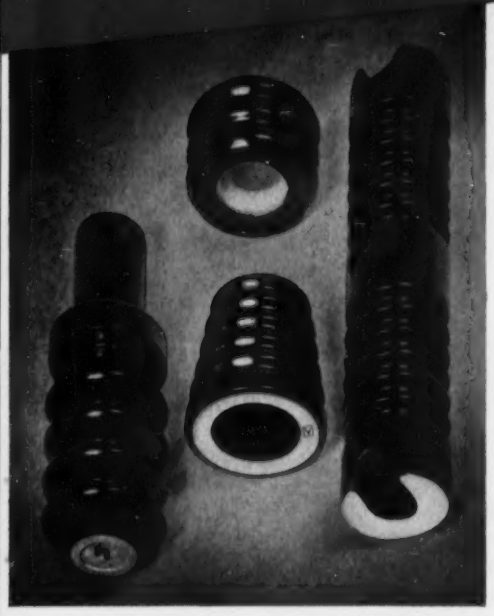
(20) The Porcelain Insulator Corp., Lima, N. Y.

This ground wire bracket for attaching overhead ground wire to existing or new tower or H-frame construction is claimed to have design advantages over rigid-type clamps. The principal advantage, according to the manufacturer, is that it eliminates damage from ground wire vibration. The bracket can be furnished with various drillings for attachment to steel or wood structures. The forged steel plate is completely galvanized and comes with either forged steel or malleable iron clamps to fit all types and sizes of ground wire.

Continuous laboratory testing and special treatment of water make possible Victor *Purified* Porcelain

Another Reason Why—

VICTOR Makes Better Insulators



Victor manufactures many special shapes in addition to a complete line of standard porcelain for transmission and distribution.

ONLY VICTOR MAKES

PURIFIED PORCELAIN

Many milestones in insulator progress have been due to VICTOR research. But none is as important as its development of *Purified* Porcelain. By specially treating the water used in the manufacture of VICTOR Insulators and employing many other ceramic advances, VICTOR gives you the finest insulator porcelain ever made—porcelain which, for the first time in the industry, is *pure* porcelain all the way through!

Purified Porcelain has vastly greater uniformity in mechanical and electrical strength values, higher mechanical impact and puncture voltage values, greater density, hardness and permanence than any other insulator porcelain. That's why more and more power men are specifying VICTOR *Purified* Porcelain Insulators.

Specify VICTOR *PURIFIED* PORCELAIN INSULATORS

VICTOR INSULATORS, INC., VICTOR, N. Y.
SUBSIDIARY OF I-T-E CIRCUIT BREAKER CO.

Low and High Voltage Pintypes • Suspensions • Guy Strains • Spools • Switch and Bus Insulators
Custom Designed Porcelain

you get low-cost secondary fusing
plus semaphore indication with the . . .

MATTHEWS CTS* Fuse

Here is the answer to your need for inexpensive protective fusing for secondary systems.

Matthews CTS Fuses give complete protection to secondary systems from service entrance to primary—at a very low cost. They can be used to isolate secondary capacitors, protect transformers in radial secondary systems, protect banked transformers, isolate service faults and for sectionalizing.

Picture at right shows closed view of Matthews CTS Fuse. Overall length including conductor tails is twenty-one inches. Available in a range from 5 to 200 amp. rating.

Red Flag Indicates Outage. The red plastic indicator on the Matthews CTS fits tight against the fuse cartridge until the fuse element ruptures. The flag is then released and instantly springs away from the cartridge. Linemen can easily spot this semaphore signal from the ground.

Stays Intact After Operation. Matthews Secondary Fuses do not fall apart and hang down after they blow and therefore cannot short-circuit other lines.

Can Be Co-ordinated—Curves Available. For the greatest possible protection on the entire system, Matthews CTS Fuses can be co-ordinated with primary fuses. Curves showing minimum melting and maximum total clearing time current characteristics are available on request.

*Cartridge Type Semaphore

Send for complete information and performance curves today

A·B·CHANCE CO·

CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

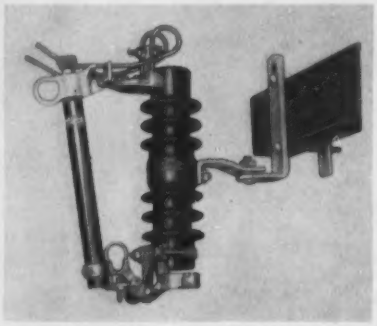
Fuse Links

(21) Southern States Equipment Corp., Hampton, Ga.

Fuse links types AK and AT have melting time-current characteristics that meet EEI-NEMA standards for distribution fuse links; feature a principle of arc extinction designed to improve dependability on overload or restricted fault conditions.

This new arc-quenching ability is accomplished through use of boric acid powder located in contact with the arc of a rupturing link. The mass of boric acid volatilizes, instantly building a vapor pressure high enough to quench the arc. In addition the high vapor pressure expels the lower end of the fuse link at a greater velocity than with a conventional spring, the manufacturer states.

These fuse links are universal type and can be easily adapted to fit any double-vented cutout from 5 kv to 17 kv, it is pointed out.



Cutouts

(22) R&IE Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.

Conforming with NEMA heavy-duty standards, the new series C cutouts have continuous current ratings of 100 amp and interrupting capacities up to 10,000 amp; come in 5.2, 7.8, 15 and 18 kv. Interchangeable fuse holders, with or without load break provisions, are available for heavy and extra heavy duty service. The load break fuse holders permit easy and positive interruption of load current, the manufacturer states. Available with the line are 200-amp switch blades.

(23) **CLAMP**—A service wedge clamp designed to permit formed three-wire drop to be put up and sagged before the cable is cut is offered by Reliable Electric Co., 3145 Carroll Ave., Chicago 12, Ill. It comes in two sizes covering the conductor range from 1/0 ACSR to No. 6 solid.

KILLARK

ALUMINUM DIE-CAST CONDUIT FITTINGS

KILLARK = *Quality*

ALUMINUM = *No Rust*

DIE-CAST = *Accuracy*

COMPLETE LINE
OVER 40 YEARS EXPERIENCE
STOCKS IN MAJOR CITIES

KILLARK ST. LOUIS

Killark

ELECTRIC MANUFACTURING COMPANY

Vandeventer and Easton Aves. **St. Louis 13, Missouri**

SALES OFFICES and WAREHOUSE STOCKS	ATLANTA	69 Mills St., N .W.	DALLAS	1903 Griffin St.	PHILADELPHIA	2014 Chancellor St.
	BOSTON	49-51 D St.	DENVER	1073 Galapago	PITTSBURGH	50 26th St.
	BUFFALO	27a Jonnson St.	DETROIT	8319 Mack Ave.	SAN FRANCISCO	714 Harrison St.
	CHICAGO	1528 West Adams St.	LOS ANGELES	412 Seaton St.	SEATTLE	4130 First Ave., S. W.
SALES OFFICES	BALTIMORE	11 W. 25th St.	COLUMBUS	2700 E. Main St.	MINNEAPOLIS	826 Andrus Bldg.
	CINCINNATI	49 Central Ave.	KANSAS CITY, MO.	616 W. 26th St.	NEW YORK	600 W. 181st St.

General Motors

announces a promising new tool for Electric Utility Companies

Electro-Mobile Power

for interim boosting in fringe areas and emergencies —in 3 versatile, fully integrated Diesel units

NINETY DOLLARS PER KW

at point of application for a typical 1000 kw unit

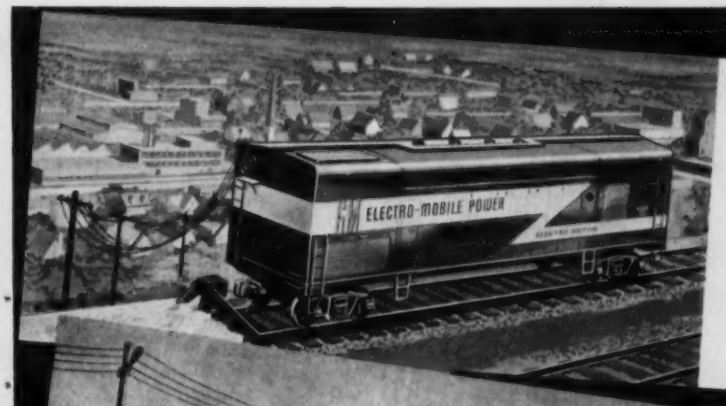
Now the Electro-Motive Division of General Motors presents, in 3 new forms, highly promising to electric utilities, mobile and portable Diesel-Electric generating plants engineered out of its two decades of experience in supplying Diesel-Electric locomotives to American railroads and containing many of the components proved in this grueling field.

General Motors railroad units today equal *one-sixth* of all the country's installed electrical generating capacity.

The controls that fit the new units to electric utility applications are the most advanced devices, employing the most up-to-date materials, in this field. Their engineering has taken advantage of science's latest contributions.

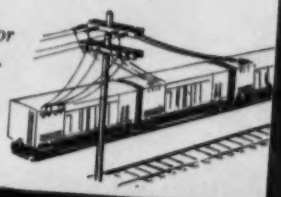
And to this development, Electro-Motive Division brings all the performance advantages and economies of mass production, and a single responsibility for all components of every unit.

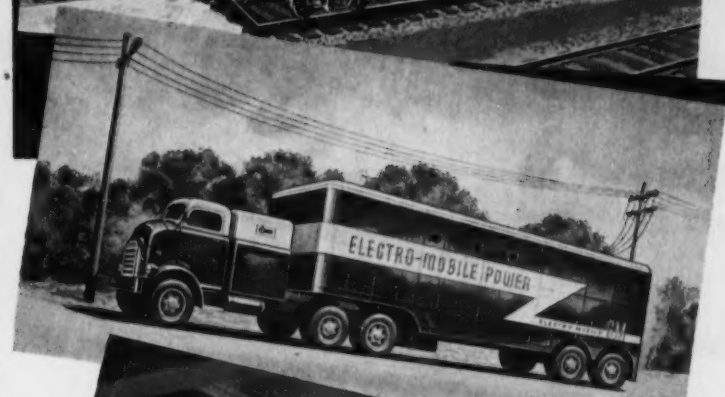
We believe that here the electric utility field has a new and remarkably adaptable tool that will fit many problems in an unusually economical way. We'd like to discuss with you the potential benefits Electro-Mobile Power may hold for your specific needs.



RAIL CAR

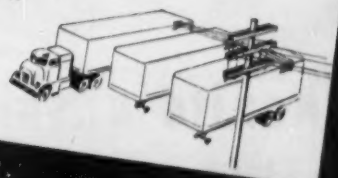
1,000, 750 and 500 kw units for use on sidings, or placed on piers for semi-permanent use.

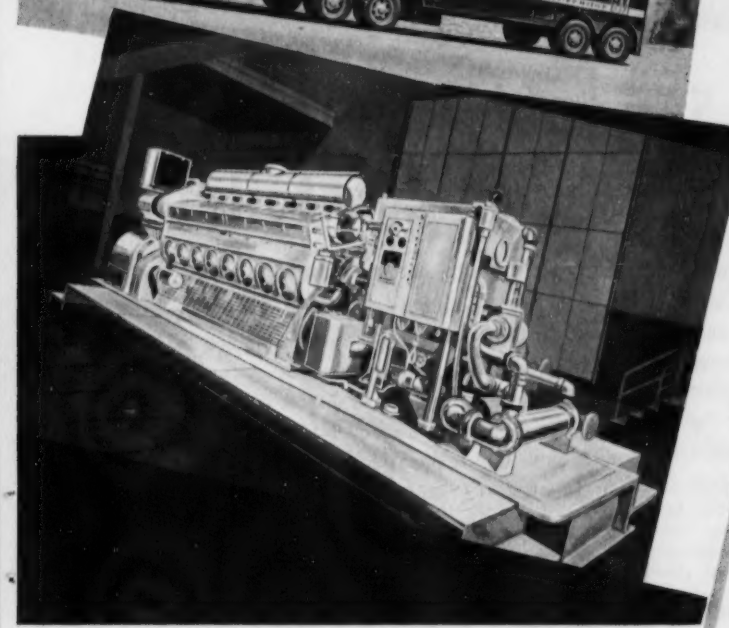




TRUCK TRAILER

500 and 350 kw units to move on highways to desired sites.





PORTABLE UNIT

1,000, 750, 500 and 350 kw capacities for permanent or semi-permanent installations.

Electro-Mobile Power FEATURES INCLUDE:

- Remote control starting and stopping
- From starting to full load within 45 seconds
- Automatic synchronization with line in phase, frequency and voltage
- Inherent 25% overload capacity
- Full protective equipment, including surge capacitors, lightning arresters, over-current relays, field failure relay
- Complete self-operation can be provided
- Ability to meet higher capacity needs by unit multiplication
- Complete national parts and service availability

Electro-Motive Division

GENERAL MOTORS

LA GRANGE, ILLINOIS

Okolite-Okoprene unshielded 5kv feeders entering basement of the switchgear room from the switchgear above.

Okonite unshielded 5kv cables help Lockheed assemble the Super Constellation

At the Burbank plant of the Lockheed Aircraft Corporation, home of the famous Constellation and Super Constellation, these unshielded 5kv Okolite-Okoprene feeders have been in service since 1941 . . . *and there has never been a failure.* Operating at 4160 volts, the feeders connect the main switchgear room to substations throughout the plant. The latest inspection showed them to be in perfect condition. This is another example of the long, outage-free service given by Okolite-Okoprene rubber-insulated cables.

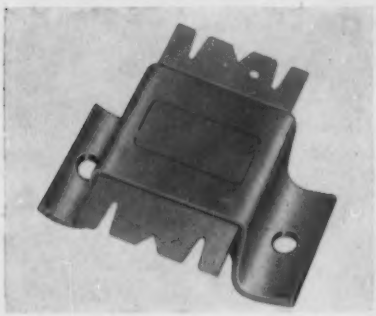
In the critical, widely-used 3 to 5kv range, ordinary cables must be shielded. However, Okolite-Okoprene cables provide a tremendous advantage because **they do not have to be shielded,** even for voltages as high as 5kv. Here's why. Okolite-Okoprene cables do not develop harmful static discharge. Furthermore, Okoprene has excellent ozone resistance, preventing corona cutting. In addition, Okoprene's high surface resistivity limits the magnitude of longitudinal drainage currents which can flow to ground at a contact point, thereby preventing cable burning.

Thus, users of Okolite-Okoprene cables for 5kv operation are assured all the advantages of unshielded cables . . . reduced cable installation time and cost . . . quick and easy splices and terminations . . . valuable space saved at terminations in crowded junction boxes . . . reduced possibility of cable failure due to improper splicing or terminating techniques.

Okonite's new 128-page Bulletin WE-1085 gives complete information on Okolite-Okoprene rubber-insulated cables in the low voltage range from 0 to 5000 volts. This bulletin includes detailed cable construction features, engineering information, installation and handling techniques, instructions for splicing and terminating. Never before has all this information been compiled in one book. Write for it to The Okonite Company, Passaic, New Jersey.

OKONITE OKONITE SINCE 1878 ***insulated cables***

2718



Concrete Insert

(24) Kindorf Division, Steel City Electric Co., 1223 Columbus Ave., Pittsburgh, Pa.

This concrete insert has a body of ⅛ in. steel and a 24-gage canopy that is spot welded in place. When the concrete is hardened a rectangular knockout can be quickly removed with a ball peen hammer to make an opening for the hanger attachment, the manufacturer states. This opening will accommodate all sizes of hanger rods from ¼ to ⅞ in., as well as ⅜- and ½-in. pipe or conduit.

Flanges are notched for quick centering on chalk lines. The knockout prevents concrete from entering the hanger rod opening. The curved anchors saddle the concrete reinforcing rods and the rods and inserts may be wired together through the holes in the anchor. Nails either draw out on removal or can be extracted by hand. Screws fastening the insert to metal forms will withdraw with the form.

D-C Tachometer Generator

(25) General Electric Co. Instrument Department, Schenectady 5, N. Y.

A low-cost d-c tachometer generator is designed for a variety of control applications as well as for accurate speed indications; gives voltage output of 50 v/1,000 rpm for speeds up to 5,000 rpm and 100 v/1,000 rpm for speeds up to 2,500 rpm.

(26) GROUND RODS—Sectional copper bonded ground rods have been announced by Jasper Blackburn Corp., 35 Madison St., St. Louis 6, Mo. Any number of these sectional rods can be coupled so that permanently moist, conductive soil can be reached, the manufacturer states. The rods are available in ⅓, ⅝ and ¾ in. diameters and in 8 and 10 ft lengths.

(27) TOOL—A new tool for electricians will slit sheathing, strip wire, cut wire or sheating. It is called the Stripex; is made by Burbank Electrical Products, 215 W. Palm Ave., Burbank, Calif.

Rugged HUBBELL® Twist-Lock

No. 7313 CONNECTOR BODY

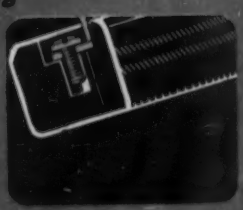
FIRST AND STILL THE FINEST BECAUSE . . .

Heavy Duty Construction

SOLID BRASS MOLDED-IN INSERTS HOLD CONNECTOR BODY TOGETHER SECURELY

Trouble-Free Wiring

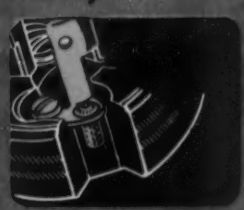
UPSET BINDING SCREWS CAN'T COME OUT!



"Bed-Rock" Blade Stability

BLADES SOLIDLY ANCHORED WITH MOLDED-IN KNURLED RIVETS

LARGER SPUN-OVER AREA



"Speed-Easy" Wiring Convenience

HEAVIER SCREWS LARGER BINDING HEADS

TERMINALS RECESSED IN CAP FOR EXTRA WIRING ROOM

Armour Plate Protection

RUGGED STEEL ARMOUR PLATE SHELL FOR MAXIMUM PROTECTION AGAINST BREAKAGE

Adjustable Cord Grip

ADJUSTABLE, STOUT HOLD-TITE CORD GRIPS TAKE STRAIN FROM BINDING SCREWS

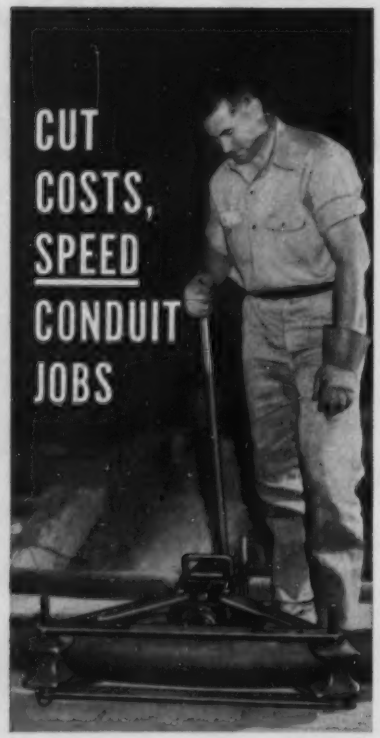
For greater Convenience, Safety, and Efficiency in the operation of motor-driven tools or portable electrical apparatus. The locking action insures positive contact in spite of rough treatment, heavy vibration, and other conditions that might cause down-time. Available in two-wire, three-wire and four-wire sizes. Three and four-wire sizes available grounded and not grounded.

Highest Grade HEAVY DUTY WIRING HUBBELL DEVICES

Dept. R-1

HARVEY HUBBELL, INC., BRIDGEPORT, CONNECTICUT

20HH84



...with Greenlee Hydraulic Pipe and Conduit Bender

Built for the tough jobs, the GREENLEE Bender saves hours, reduces costs on your conduit work. With a GREENLEE *one man* quickly makes bends in pipe up to 5", rigid and thin-wall conduit *right on the job*, exactly where and when needed. Many owners report time and labor savings of 50% or more . . . and the cost of many manufactured bends and fittings is entirely eliminated. Compact, portable, versatile to reduce your costs, eliminate construction delays, keep jobs rapidly moving along on schedule. Available in two sizes. Thousands in use by electrical contractors, utilities and plant maintenance departments. Often pays for itself on the very first job!

FREE BENDER BOOKLET with complete data and illustrations on GREENLEE line of hand and hydraulic benders for tubing, pipe and conduit. Shows how to do various bending jobs quickly and easily to cut job time, reduce costs.

GREENLEE

GREENLEE TOOL CO.
1771 Columbia Ave., Rockford, Illinois

Rural Regulator

(28) Line Material Co., Milwaukee 1, Wis.

A single-phase rural regulator with four 2.5% steps is said to yield economical and dependable service in locations where fine regulation is not required. Designed for pole mounting, the unit incorporates a rugged tap-changing mechanism, a tap position indicator that is readable from the ground, Round-Wound core and coil assembly in Orto and a voltage control that may be mounted on the pole base or the tank. A lightning arrester is provided across the series coil. The line arrester is available at extra cost.

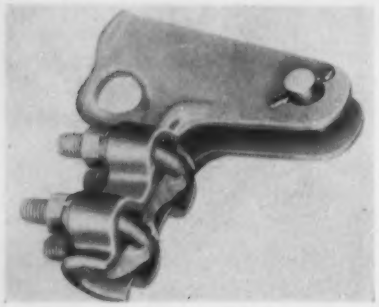
This regulator comes in 15 and 25 amp sizes of 7,620 v for use on multi-grounded wye circuits of 7.62/13.2, 7.2/12.47, 7.96/13.8 or 6.9/11.95 kv. A common ground terminal is provided on the tank. Two taps on the control winding make possible 120-v control voltage for either 7,620- or 7,200-v primary. The contact-making voltmeter can be adjusted to maintain any voltage level between 110 and 130 at the recommended band width of plus or minus 2 v, it is stated.

Receptacle

(29) Slater Electric & Mfg. Co., Inc., 56th St. and 37th Ave., Woodside, N. Y.

Designed to meet two-circuit specifications, the 393 two-wire-three-wire duplex receptacle is for new construction and replacement. Suggested by its manufacturer for use where grounding of portable tools and equipment is required, the receptacle also accepts parallel bladed caps used on appliances and housewares that do not require grounding. Because of two-circuit construction, 10 amp, 250 v, three-wire grounded or three-phase systems can be accommodated for applications such as air conditioning or small three-phase motors, it is pointed out. UL and CSA listed; complies with new NEMA and ASA codes.

For more data fill in coupon on page 66



Dead End Clamp

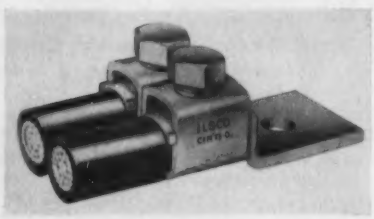
(30) Porcelain Products Inc., High Voltage Division, Parkersburg, West Va.

This new malleable iron dead-end clamp for hot line work features Captured Keeper U-bolts fastened directly to the keeper. Cable range is .20 to .50 in. It is suitable for use on ACSR No. 4 through 1/0; and for use on copper, copper weld or Amerductor. The clamps can be furnished with aluminum or copper liners if desired.

Speed Reducers

(31) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

A new line of large industrial speed reducers for heavy industry consists of a series of single- (type WSH) and double-reduction (type WDH) units. Thirteen standard ratios from 2.24 to 9.21 are available for type WSH; 16 ratios from 11.3 to 70 for WDH.



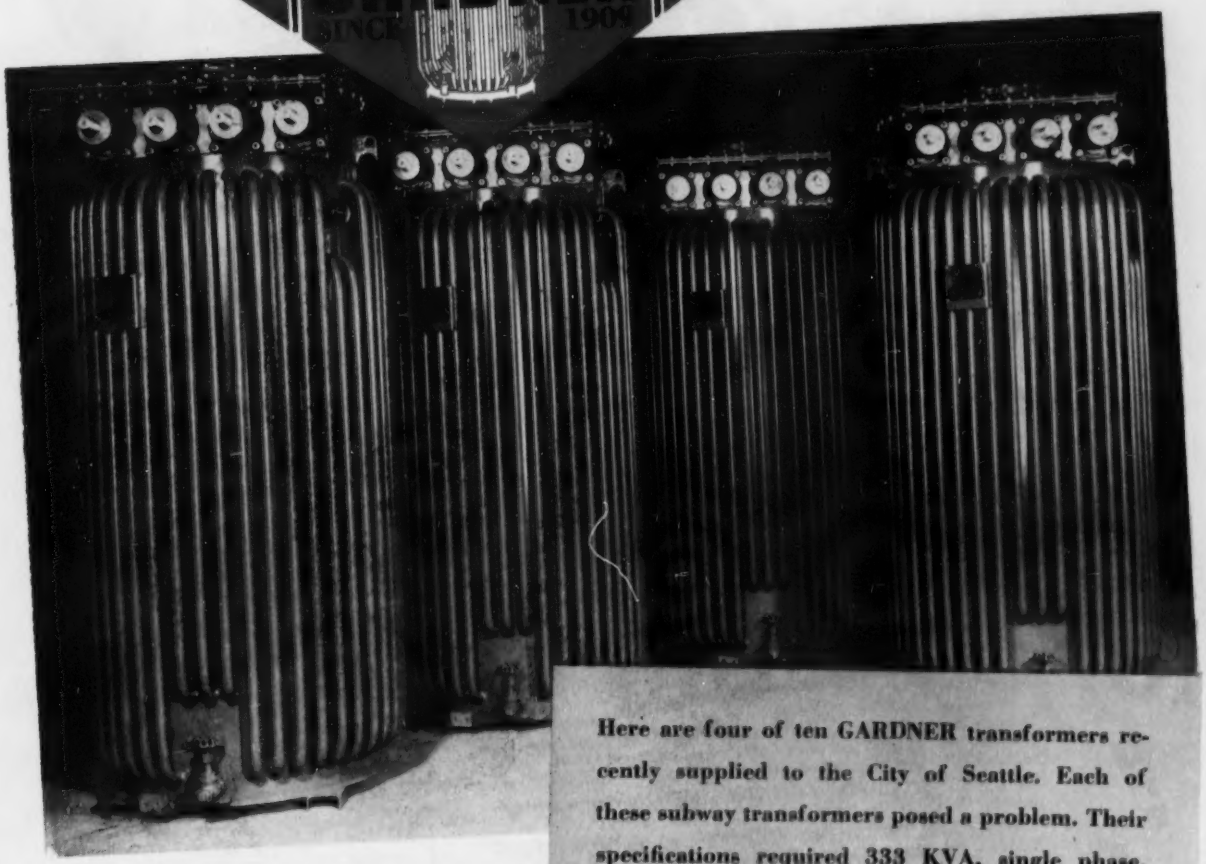
Connector

(32) Ilsco Copper Tube & Products Inc., Cincinnati, Ohio

The LU-2 multiple lug is now available with a wire range for two 4/0 to two 1/0 cables in addition to LU4 and LU6 multiple solderless lugs. The manufacturer states that the compact design permits the two cables to be installed in the space ordinarily required for one larger cable. Wires are wedged between arched pressure bar and V-bottom collar to establish a permanent grip with positive contact.

VERSATILE ENGINEERING

GARDNER SINCE 1909



Here are four of ten GARDNER transformers recently supplied to the City of Seattle. Each of these subway transformers posed a problem. Their specifications required 333 KVA, single phase, 2400/4160Y volts to 120/240 volts with standard taps . . . and they had to go through a 42" manhole for installation. The versatile engineering and flexible production facilities at GARDNER surmounted this problem right in stride, and these ten transformers have been in successful operation since their installation.

★ Special problems are welcome. Our experience is widespread and our production line is flexible. Write for information.

GARDNER ELECTRIC MANUFACTURING COMPANY

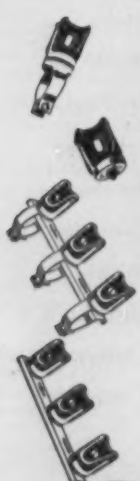
SUBSIDIARY OF FEDERAL PACIFIC ELECTRIC COMPANY

4227 HOLLIS STREET EMERYVILLE (OAKLAND) 8, CALIFORNIA

The Old Reliable!

for greater strength

RUGGED
DURABLE
DEPENDABLE



Porcelain Products wireholders and secondary service materials are built to pace-setting standards that *mean* reliability!

STRONG, STURDY CONSTRUCTION—for customer satisfaction.

METAL in TENSION—PORCELAIN in COMPRESSION—a feature so many contractors like.

HOT-DIP GALVANIZED steel parts, including the screw, for durability.

EXTRA SHARP SCREW THREAD—LUBRICATED reduces torque required to turn screw, makes fast, easy driving.

SCREW-SHANK HEAVIEST at base for maximum strength where load is most critical.

LARGER, PULLEY-ACTION WIRE HOLE—for easy installation of large wire sizes and to eliminate damage to insulation.

SCREW LENGTHS—2¼ inch and 3 inch standard stock items.

QUALITY—the name PORCELAIN PRODUCTS today, as for generations, is a by-word for quality, dependability and fair dealing.

See your distributor for complete details.

ELECTRICAL PORCELAIN SINCE 1894

60 years

Porcelain Products, Inc.

PP —INC—

FINDLAY, OHIO

Assembly

(33) Crouse-Hinds Co., Wolf & 7th North St., Syracuse, N. Y.

A bracket arm (type GPT) and two general-purpose floodlights have been designed as a one-pole assembly. The cast aluminum crossarm slip-fits 2-in. pipe. Its top section will take two MDB-14 lighting fixtures and a center vertical 1½-in. pipe may be added to accommodate a third. Its two end and two bottom hubs are tapped ½ in. for mounting four MDB-10 floodlights.

The removable center plate has a terminal block attached to which the wire lugs of the floodlight cables are fastened. Fixture installation is completed by setting the assembly on the pole and attaching the incoming service leads to the terminal block.

The new MDB-14 floodlight comes in a selection of lenses to give beam spread required for different mounting locations.

MDB-10 also comes with flat base for installation in grounds, lawns or turf. This base has a diameter of 6 in. and two mounting holes spaced to fit a 4-in. outlet box and a 1½-in. knockout. For temporary mounting, a steel ground stake is available.

Bulletin 386-F gives details.

Fill in Coupon, Page 66

The smallest thing in your turbine

...yet it can cost you $5000 an hour

You can hardly see it here. You'll probably never see it in your turbine. It's a tiny spot of rust.

But let it grow big enough to flake off into your turbine's lubricating system, and it may knock out the governor.

Then you're in for trouble. Trouble that can cost up to $5000 an hour in shutdown costs and lost revenues. Many recorded case histories prove this.

But, this needn't happen to you—if you use Shell Turbo Oil. For this unusual oil contains the *most effective rust inhibitor yet devised!*

Test after test has proved that no other turbine oil is so effective in preventing rust—*even in the presence of salt water!* In one installation, for example, the original charge of Shell Turbo Oil has been in use since 1940!

So make sure your turbines are protected from costly rust. See your Shell representative about rust inhibited Shell Turbo Oil today.

SHELL®

***Stop rust now before it's big enough to stop you...with* SHELL TURBO OIL**

NORTH—Shakopee, Minnesota praised the performance of its Form 206 luminaires. The new lights provide superior illumination even in sub-zero weather.

EAST—Central Maine Power Co. accomplished their working objective of providing better street lighting economically by installing Form 206 fluorescent lights at Auburn, Maine.

NEW G-E FLUORESCENT STREET LIGHTS GAIN NATIONWIDE ACCEPTANCE

Are fluorescent street lights practical? Utility and municipal officials who have installed G-E Form 206 fluorescent luminaires are best qualified to give the answer. Their actual field experience, in all parts of the country, is summarized in the following questions and answers.

WHY USE FLUORESCENT STREET LIGHTING?

Fluorescent street lighting provides better visibility and a more even light distribution than the best engineered systems of either filament or mercury lamps. The low brightness of the light source reduces the glare and eye strain that accompanies other types of street lighting.

IS VISIBILITY IMPROVED?

Yes. Many lighting experts believe that fluorescent street lighting increases actual visibility by about one-third. Thus, a 1.25 footcandle level from a Form 206 fluorescent luminaire seems to provide the same visibility as a 1.7 footcandle level from filament or mercury luminaires.

IS THE COLOR OF THE LIGHT PLEASANT?

Yes. The whiter light furnished by the fluorescent lamps does not distort the familiar coloring of objects and people. Businessmen find that shoppers even come from outside usual trading areas to shop under the comfortable light from the fluorescent luminaires.

IS THE SIZE OF THE LUMINAIRE A PROBLEM?

No. The Form 206 luminaire is only slightly over six feet long and the distinctive size and shape add functional beauty to the appearance of any street or roadway. No guys or trusses are required to support the luminaire even in high winds.

WHAT MAINTENANCE IS REQUIRED?

Maintenance is reduced! The fluorescent lamps used in the Form 206 have an average lamp life of 7500 hours, or about two years of street-lighting operation. The hinged plastic globe is shatterproof and is tightly sealed to prevent dirt or insects entering the unit. Sun, rain, heat, cold, or aging do not adversely affect the plastic globe or the light output.

HOW DO COSTS COMPARE?

When over-all lighting costs are computed on an equivalent visibility basis, G-E Form 206 fluorescent luminaires cost less than any other comparable system of filament or color-improved mercury. Although equipment and amortization costs are somewhat higher, installation costs are comparable, and operating costs are generally lower.

GET MORE INFORMATION about this outstanding G-E fluorescent luminaire, the Form 206. Contact your nearest G-E Apparatus Sales Office, or write Section 452-139, General Electric Company, Schenectady 5, N. Y.

SOUTH—Statesville, North Carolina installed 104 Form 206 fluorescent street lights and was enthusiastic about their visual comfort, economy, and modern appearance.

WEST—Virtually glareless illumination and an even light pattern resulted when Seattle installed Form 206 luminaires to light the second level of this new Alaskan Way viaduct.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

PRODUCTION & PROMOTION in FULL SWING...

markel maid
ELECTRIC
Fry-Pan
$19.95
ONLY
Automatically
COOKS EACH FOOD RECIPE
PERFECTLY...
RIGHT AT THE TABLE TOO!
✓ PAN FRY ✓ CHAFE
✓ STEW ✓ DEEP FRY
✓ BAKE ✓ CASSEROLE
WITH ADJUSTABLE DIAL HEAT CONTROL
Any Child Can Operate the Automatic Thermostat Dial!
Cook Breakfast, Dinner ... Eggs, Pancakes, Bacon, French Frys, Meats
SQUARE 11" PAN, DEEPER TOO . . . GIVES MORE COOKING AREA
JUST SET DIAL from "warm" right on up to 420°!

IT'S BIGGER
Popular-Priced!
Automatic!

markel maid
ELECTRIC
Fry-Pan

MADE TO SELL and sell fast at $19.95 (LIST)

MARKEL ELECTRIC PRODUCTS, Inc.
145 Seneca, Buffalo 3, N.Y.

BULLETINS ETC.

(34) INSULATION — Three descriptive sample folders to introduce a new series of composite asbestos electrical insulations are offered by Johns-Manville, 22 E. 40th St., New York 16, N. Y. They are: EL-54A covering Quinterra type 3-GR, a Class H electrical insulation for temperatures up to 250 C; EL-49A on Quinterra types 5-GR and 5-GL, Class B purified asbestos insulations for temperatures up to 150 C; EL-55A on Quinorgo Nos. 4000-GR and 4000-GL, Class B purified asbestos insulations.

(35) TAPES—A 20-page catalog on Permacel pressure-sensitive electrical tapes and non-electrical Texcel and Permacel tapes is available from Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 6, Ill. It contains revised and additional technical data, photos and application information.

(36) WIRING SYSTEM—A new low-voltage wiring system for control and remote control of multiple circuits is described in a six-page bulletin from The Bryant Electric Co., subsidiary of Westinghouse Electric Corp. A copy may be secured from Bryant, Dept. L-263, Bridgeport 2, Conn.

(37) TRANSFORMERS—A 20-page booklet on load center transformers is offered by R. E. Uptegraff Mfg. Co., Scottdale, Pa. It is designated catalog No. 132.

(38) DEVICES—A four-page supplement to its catalog 1-54 has been prepared by Slater Electric & Mfg. Co., 56th St. and 37th Ave., Woodside, N. Y. It lists 39 additions to the Lifetime wiring device line.

(39) HISTORY—Steel City Electric Co., Pittsburgh, Pa., has published a 50-year anniversary issue of its house organ, Time Out, with the company's history and pictures of plant and personnel.

(40) MAINTENANCE—For electrical and maintenance supervisors and operating men, a series of pamphlets on motor and generator maintenance is offered by National Carbon Co., 30 E. 42nd St., Room 1328, New York 17, N. Y. These pamphlets will be issued every other month for two years.

(41) CATALOG—Ilsco Copper Tube & Products Inc., Cincinnati 27, Ohio, has published a new catalog of its connectors and devices. It is illustrated and indexed.

(42) SERVICE EQUIPMENT—A new bulletin giving a complete listing of its Noark line of fusible service equipment, 30 through 6,000 amp, is offered by Federal Pacific Electric Co., 50 Paris St., Newark, N. J.

(43) STEAM TURBINES—Trends in steam turbine design are given in publication 03R8182 available from Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis. This manufacturer is also offering a progress report on three years' experience in supercharged internal conductor cooling of steam turbine generators, in publication 05R8168.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST *Not good*
68 Post St., San Francisco 4, Calif. *after January 1*

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 5 7 8 9 10 11 12 13 14 15 16 17 18
19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43

If described in advertising, fill in page number

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NAME..... TITLE.....

COMPANY.....

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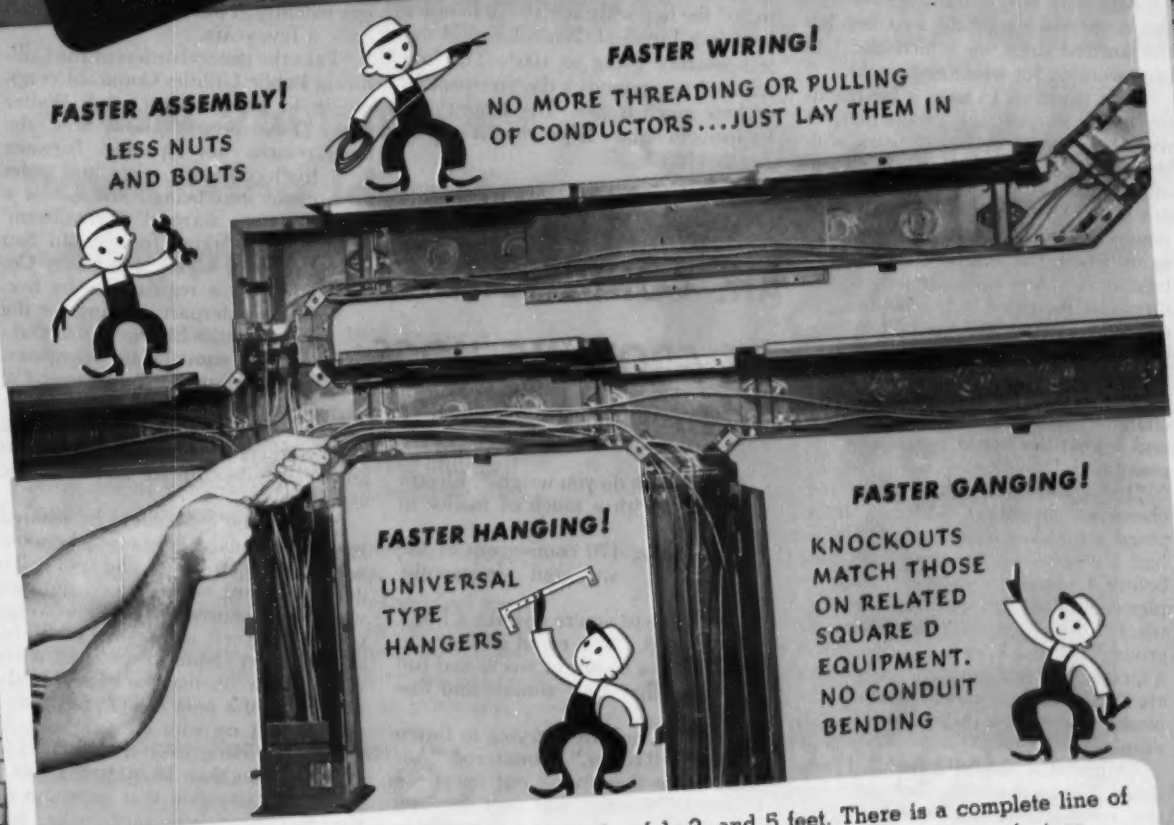
CITY..... ZONE..... STATE.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

INSTALL WIREWAYS FASTER!

SQUARE D's NEW AND EXCLUSIVE *Lay-in Duct*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NO MORE THREADING OR PULLING OF CONDUCTORS...JUST LAY THEM IN
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UNIVERSAL TYPE HANGERS
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Square D's exclusive design provides hinged covers for both the duct sections and connectors. Easily removable fitting covers then provide a completely unobstructed wireway in which to lay wires.

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• • •

Write for the complete story of **LAY-IN DUCT**—how it gives you a better wireway system, easier, faster and at less cost. Address Square D Company, 4335 Valley Blvd., Los Angeles 32, Calif.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

ELECTRA'S HUSBAND

"AIR conditioning for hogs—now I've heard of everything," I said to Electra as I glanced up from a batch of papers representing a recent evening's homework.

"And why not, if the hogs like it," she countered dropping into her lap the knitted dress on which she had been working for weeks and weeks.

"This promises to have a far-reaching effect on livestock production," I went on, "because it may work with beef cattle, chickens and a lot of other animals. They have found out that a growing hog—a 100-pound feeder—produces the best gains when the temperature is held at 70°. Any variation either direction increased the amount of feed necessary for the hog to put on a pound of weight. The tests were made up at the University Farm in a psychrometric chamber where the temperatures and humidities could be closely controlled."

"I don't know anything about psychometric chambers," Electra interposed somewhat impatiently, "but we had a system up on the ranch long before I married you of keeping the pigs cool in the summer time. We simply let the windmill pump onto the ground and the hogs made themselves a nice big cooling mudhole. After they ate they would go and lie down in the mud. The air conditioning was that simple."

"All that's old-fashioned," I reasoned. "They don't raise hogs that way any more. They have feeding sheds where they are given a balanced ration that will produce the maximum amount of weight. Sometimes they provide a little shade for them besides. These tests showed that at 70° an average hog would add 100 lb of weight from 250 lb of feed. When the temperature goes up to 90°, 400 lb of balanced ration was needed to produce the same gain. And when it got up to 100° it took 750 lb of feed to make 100 lb of pork. That's a 300% increase in feed."

"Yes, and when it gets that hot, a pig will turn up its toes and die if it is subjected to the least bit of exertion," she commented sagely. "One summer some kids from the city chased a bunch of pigs on the ranch on a hot day and four of them—pigs, not kids—keeled over."

"They must have been big hogs," I said. "It's a funny thing how the air conditioning affected hogs weighing 200 lb. They really like it cool—down to about 60°. Then they put on 100 lb of pork for 350 lb of feed. If it gets up to 90° the hog will eat 1,100 lb in order to gain a hundred. Heaven forbid the temperature going to 100°. The hog will lose two pounds a day irrespective of how much it eats. The same thing happens to lighter hogs when it gets as hot as 110°."

AIR CONDITIONING FOR GROWING HOGS

"How much do you weigh?" Electra challenged with a touch of malice in her voice.

"Just under 170 coming out of the shower," I answered innocently. "Why?"

"It's too bad you're not like a hog," she bantered. "You could go down to Arizona for a couple of weeks and run around in that 100° climate and lose 20 lb."

"Yes, but nobody is trying to fatten me up to sell either," I countered. "Another thing they found out up at the University Farm is that cool drinking water helped the hogs to gain weight—more than a quarter of a pound a day in fact."

"Are hogs any better than people?" she mused.

"Of course not," I said. "What makes you ask?"

"Well if they are going to give a lot of hogs air conditioning, I think I know a lot of people who might wish that they could work in pig sties," she said. "There are some big buildings where folks would improve their efficiency, just like a hog gains weight, if the temperature could be kept down around 70."

"I know, I know," I said. "But they give the people cool drinking water."

Many of the rules and regulations affecting various phases of business have strange beginnings. Walter Walsh, engineer turned lawyer, who recently received an Old-timer's certificate from the San Francisco Electric Club for fifty years in the electrical industry, was discoursing on the subject recently at lunch. He took us back quite a few years.

"Take the general orders of the California Public Utilities Commission applying to line construction," Walter said. "Few people know how the measurement for spacing between high-voltage wires and poles came into being. There was a lineman named 'Broadbeam' Keefe working for the old San Francisco Gas & Electricity Co. who was a regular five by five. His counterpart working for the Bay Counties Electric Co. in Oakland was named Hans Waggoner. Both men weighed well over 250 lb. Hans ultimately became business agent for the electrical workers union, and as such was an ardent advocate for safety in line work.

"One of the concessions he secured was a standard distance between wires on a crossarm and pole. To determine just what a safe distance was they measured the beams of Waggoner and Keefe and settled on 36 in. as the proper clearance between wires to permit a lineman to climb safely to the top of a pole. The orders today specify that no wire carrying electrical energy dangerous to human life may be closer than 18 in. to the pole."

Another situation that grew out of the San Francisco earthquake and fire had to do with jurisdiction between plumbers and electricians.

"Many homes that had been served solely with gas were rewired for electric lights," Walter declared. "Because the plumbers claimed all jurisdiction over work dealing with pipes, they insisted that the job of pulling wires belonged to them. So most of the rewiring was knob and tube until one of the manufacturers came along with a lighter pipe that would not hold either water or gas. They called it conduit and the electricians fought for jurisdiction and won it.

"Some day get me to tell you how the Woman's Outdoor Art League was organized and how it got a law passed to have all poles within city limits painted green."

VAULT BEFORE

VAULT AFTER

Cuts space needs in half!

New Vault-Type Power Unit Ideal for Shopping Centers

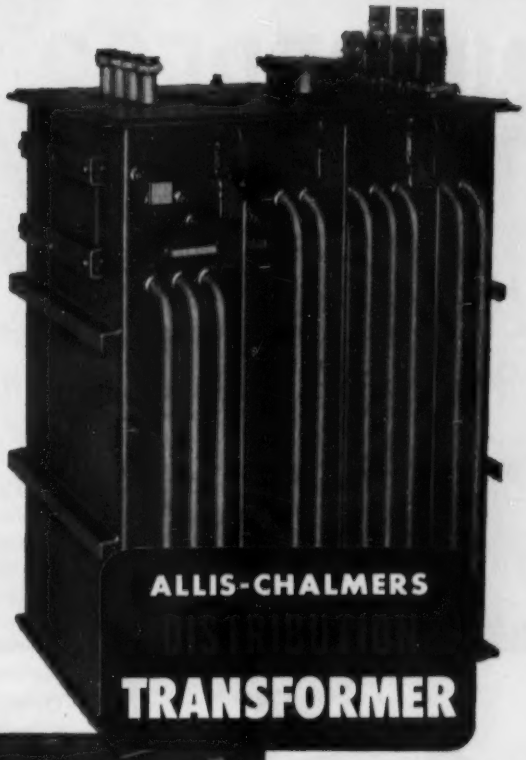
ALLIS-CHALMERS NEW vault-type power unit provides three or four standard distribution transformer core and coil assemblies plus metering transformers in a single, submersible-type tank. The units are so compact that a complete vault-type power unit takes only half the space of a bank of three single-phase distribution transformers.

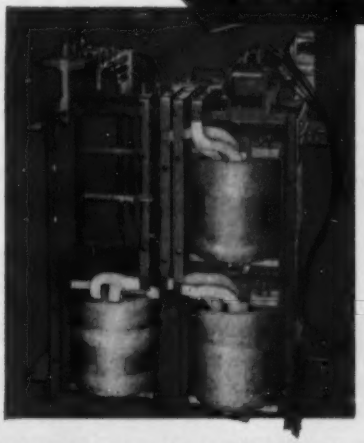
The new unit can be designed to supply three-phase power or three-phase power and single-phase lighting loads. It is the ideal answer to the space problem in areas like schools, hospitals, large apartment houses or where increased use of air conditioning or other large appliances is causing loads to grow fast.

Simplified Installation

Allis-Chalmers vault-type power units can be installed either underground or in buildings. Core and coil assemblies are internally connected at the factory and leads are terminated at the cover. This reduces installation time and expense by eliminating primary and secondary bus work.

Get complete information on the space-saving advantages of Allis-Chalmers new vault-type power units. Consult the A-C office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4426



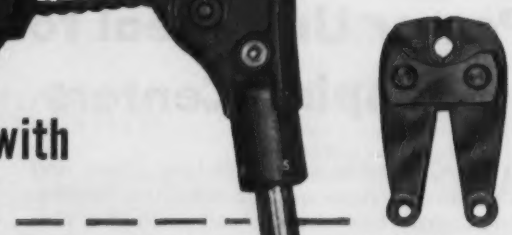


TEMPORARY CLAMPS seal HV access panel until installation. After final system connections are made, panel is welded into position. All other covers are weld-sealed. Special paint and compound protect case. Space is provided for an additional core and coil assembly to change a three-phase unit into a combination single-/three-phase unit.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

NEW NICOPRESS NO. 88 TOOL with



INTERCHANGEABLE HEADS ARE QUICKLY ATTACHED

INTERCHANGEABLE HEADS

● This mechanical tool develops tremendous power by a combination of compound leverage and progressive ratcheting action. A few short strokes of the easy-working handle produce the powerful jaw pressure necessary to assure dependable full-tension splices.

Quickly-changed tool heads permit splicing a wide range of larger conductors. Write for Bulletin 88.

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EXPERIMENT in adsorption: add tapes made with colloidal carbon to deteriorated oil; stir. Note that Carbon Black *adsorbs* impurities. Clear oil results. In Type CB Cable these carbon-black tapes purify oil by the same process.

"Black Magic" makes this cable last longer

Heat and electrical stress . . . heat and electrical stress . . . keep it up long enough and insulating oil in ordinary paper cable breaks down. The cable may have to be replaced.

ANACONDA Type CB* (Carbon Black) Power Cable is different. Special carbon-black tapes continually purify and stabilize the insulating oil . . . keep oxidation products outside the dielectric field. They stop ionization discharges. "Black magic" insures added life for this superior cable.

For greatly extended sheath life of ANACONDA Type CB Cable, specify ANACONDA F-3** alloy. This superior alloy-lead sheath won't age-harden . . . resists slow-bending fatigue, creep, burst and abrasion. Cable joint sleeves also are available in this same alloy. They all offer higher tensile strength, a 50% higher bursting strength than copper-lead, lower creep rate and similar increased resistance to bending fatigue and vibration.

Ask your Anaconda Representative to show you how this outstanding cable can help give your distribution system maximum service life and economy. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* B5333

*CB — Carbon Black (U. S. Patents 2,102,129, 2,405,853) Reg. U. S. Pat. Off.

**F-3—Arsenic-Lead Alloy (U. S. Patents 2,300,788, 2,375,755, 2,504,600 and 2,570,501) Reg. U. S. Pat. Off.

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Service and overhead distribution cables, bare and weatherproof, including ACSR • signal, control and communication cable • portable cords and cables • network cables • airport and series lighting cables • mine cables • magnet wire • copper, aluminum and copperweld conductors • wire and cable accessories.

QUICK SERVICE FOR GROWING WEST — *Anaconda's integrated plant at Orange, California, assures western industry of quick, sure service on wire and cable for every kind of application. Contact Anaconda Sales Office at: Los Angeles, San Francisco, or Seattle.*

"THE STORY OF LIGHT," produced in Holland for General Electric's public education program, is being released to commercial theaters, schools, customer groups this month. The movie will help spotlight Light's Diamond Jubilee, create goodwill for entire electric industry.

Can these educational programs help you in

Telling story of today's low-cost electricity

"75 YEARS' ENGINEERING PROGRESS," theme for G.E.'s latest ad in national magazines, is being previewed by Ralph P. Wagner, chairman, Electric Utilities Program of Light's Diamond Jubilee, and G.E.'s George Conway.

"FREEDOM AND POWER," designed to appeal to every type of audience, highlights the development of the electric power industry against an inspiring background of America's historic struggle for freedom.

Activities commemorating Light's Diamond Jubilee point to engineering progress in winning new friends for industry

The 75 years of electrical progress, that began the night Edison proved that the incandescent light was economically feasible, will pass in review before the entire American public this month. In helping to celebrate this milestone, General Electric, on behalf of the industry, is releasing a dramatic new movie, "The Story of Light."

MOVIES FEATURE PROGRESS

The new G-E film was produced in Holland and brings to the screen a new stop-motion puppet technique in picturing the history of light. In addition, G.E.'s "Freedom and Power," a movie that underscores the importance of economic liberties and America's electric power development, brings the heritage of Edison into new focus. At the same time, the Edison Electric Institute's outstanding film, "The Eager Minds," is stimulating broad appreciation for the research and ingenuity responsible for today's many electrical comforts.

AVAILABLE TO YOU

Movies, exhibits, publications, and a series of four-color ads telling the story of "electricity, today's greatest bargain," are part of the General Electric public education program designed to tell the stirring drama behind the electric industry's technological advances. Much of this material is available to you, to aid you in telling electricity's story as well as impressing your public with the vital role which the utility industry has played in the growth of America. An illustrated catalogue of publications, designed to reach teen-age America, can be obtained by writing to General Electric Company, Dept. 2-119, Schenectady 5, N. Y. For prints of the films discussed, contact General Electric Company, Sec. 301-254, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

NOVEMBER 1954 Vol. 113, No. 5

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Let's do a better job of "farming"

Expense Control Is the Answer

John T. Kimball, Vice-President, Arizona Public Service Co.*

In the utility business we need to do a better job of "farming." What are some of the areas to which we can turn our thinking in terms of doing a better job of rendering acceptable service at a price that our customers are willing to pay? What have we done and what can we be doing to improve our efficiency?

Expense control is one of the fields in which the answer lies.

Treasury and accounting procedures need to be scrutinized carefully. Here are areas in which we should be finding ways and means to cope with rising costs in the utility business, both in terms of reduced expense and cost control, as such control affects other areas of operations.

There are ways this can be done, such as budgeting and reporting. Too many consider the budget to be just a forecast. Budgeting and reporting can be as effective a method of expense control as the actual day-to-day supervision of your best foreman on the job.

We need to develop budgeting and reporting to the point where we can put our finger on the weak places in our operations. That takes analyzing and study by people assigned to that special job. We should be looking for ways and means to reduce expenditures and expenses in customer accounting through simpler and less costly methods.

Twenty Clerks Saved

Our company has had a rather elaborate setup on customer's records, especially on credit control. Also, we had rather detailed records on facilities on customer services. We had an extensive setup for customer accounting and bookkeeping. Here were three separate and distinct functions all pointed at maintaining detailed information on each customer served.

We got to studying this setup and came to the conclusion that all we needed, as far as customer credit records were concerned, was a bad-debt record. We take people at their face value. If we discover that a customer is not a good-pay customer, then that customer goes into the bad-debt list. We have no credit record for our good-pay customers. Thus, we have eliminated the elaborate customer history record file that we had.

Then, we discovered that we didn't really need all the customer facilities file information. Now that is being simplified and consolidated into a simple locator file by street addresses.

Out of the simplification of the two files has come a saving of 20 clerks.

We are prone to feel in this industry that everything has to be mistake-proof. We are afraid to take a chance on losing a single meter, or meter reading or customer, as such may pertain to record keeping. When you consider the records that are kept to assure that there will never be a mistake made of that kind, it seems to me that there should be a simpler and less costly way of doing that job. We have come to the point in this industry where we need to be hardboiled on such expenses.

Savings in Operation

In the field of engineering, operating and construction there is a feeling that if a dollar is being spent for construction you don't have to worry about it. It isn't spent on operations. In Public Service, when we spend a dollar for capital outlay, we know that we have to collect about 17c a year to pay for that dollar. A dollar spent for construction is as important as the dollar spent for operation. They should be spent wisely too.

We should be as concerned about constructing our plant adequately, yet not expensively, as we are about any other dollar we spend.

Mechanized Equipment

In the construction field full advantage should be taken of mechanized equipment to effect economies. As an experiment, we have a five-man crew that has been equipped with power tools. This crew is doing work that would require a heavy crew working without that type of equipment.

The transportation department is the spark plug in that particular field. We use industrial monkeys, hydraulic lifts and hydraulic ladders. These tools make it possible to do a job quicker and more efficiently.

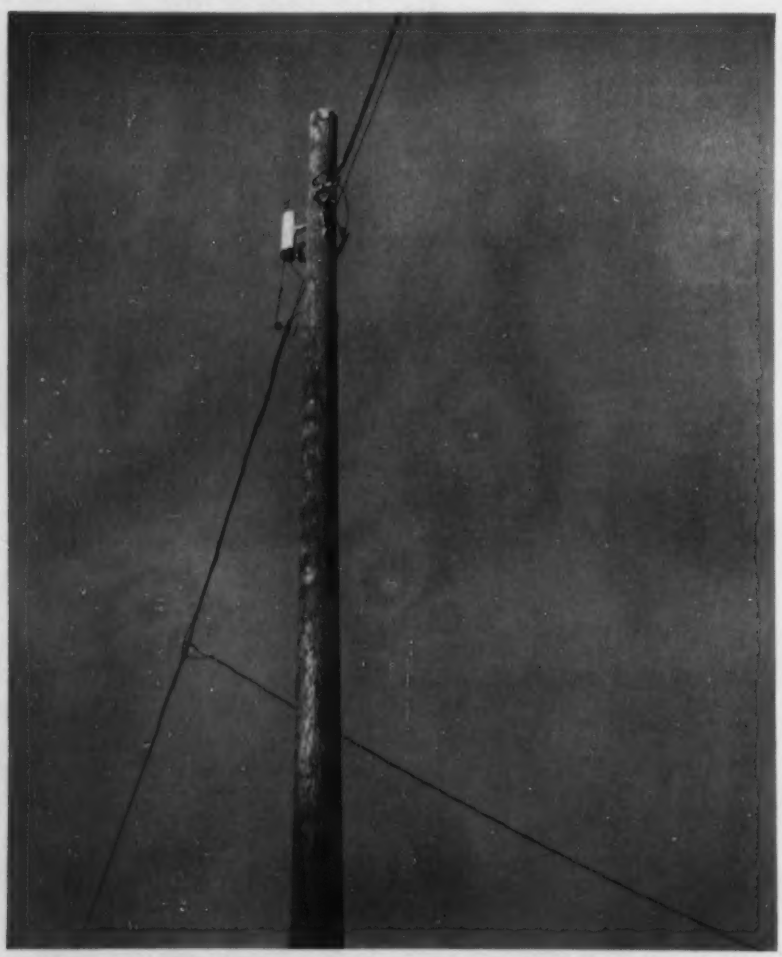
In this field of new types of construction we are using field spun aluminum aerial secondary cable. This has made possible midspan taps, longer spans for pole economy, has reduced flicker voltage from air conditioning motors, is streamlined and unobtrusive in appearance, along with other advantages. When this construction was first started two years ago it offered no saving over racked secondaries, but now that stringing the cable has become routine and hydraulic ladders are used for making the service taps, worth-while economies have been effected.

Communication

There have been many advances in the field of communications. Microwave, just one of the new developments, can provide channels for voice, telemetering, relaying, supervisory control of substations and many other system functions. In terms of pay roll dollars saved, it offers great opportunities

* Since making this speech in essence before the meeting of the Rocky Mountain Electrical League at Estes Park, Colo., Sept. 15, Kimball has become vice-president and general manager of the Idaho Power Co. at Boise.

Hydraulic ladders for making midspan taps are saving money for Arizona Public Service



Aluminum secondary cable makes possible midspan taps and longer spans for pole economy

for reducing operating cost and improving service.

The electronic age offers possibilities in operating efficiency all the way from microwave to electronic machine billing, accounting and inventory control. We need to begin to scratch the surface in savings that can be made in this field of electronics and communications.

Transportation Savings

The amount of money spent on transportation demands that attention be given to controlling this element of expense. Many companies are giving consideration today to leasing their transportation equipment. We have given this consideration but do not believe that we can save money at this particular time by so doing. I do not know of any utilities that are leasing their automotive and transportation equipment, but many other types of companies are doing so.

Centralization of Records

Where a utility's service area covers a number of smaller towns and communities, there are opportunities for savings through paper work centralization and service work decentralization. In Public Service this is in progress now. For instance, we are taking all the paper work into Phoenix for some eight small towns. This will include customer bookkeeping and service calls. The service work will be dispatched back to the area of origination by radio. Studies are being made now to determine the location of several service centers around Phoenix to handle such service work, as well as construction work.

We know we are going to save a lot of dollars by this centralization of services and decentralization of service and construction work.

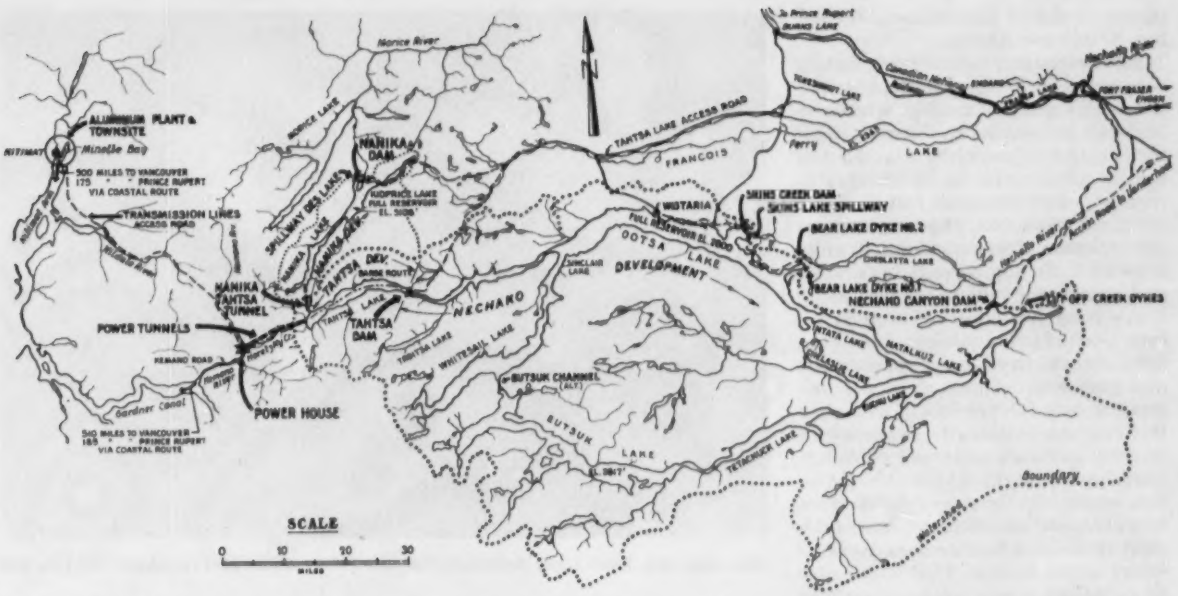
Closer Supervision

There is another need which seems to me should have attention. We must find ways and means to develop the competitive urge on the part of the first line of supervision and the folks who work for them.

The competitive urge that we need to feel in our business is how can we do a better job, a more acceptable job —cheaper. Because by so doing we will certainly be helping ourselves, our customers, our employees, our stockholders and the public generally.

Like the farmer said to the book salesman: "Son, I don't need no books on farming, I ain't farming now half as well as I know how."

In the utility business we need to do a better job of "farming."



Drainage in this area was reversed by dam creating storage of 19,000,000 acre-ft to supply hydro plant that will have 1,696 mva

Alcan Pours Aluminum at Kitimat

Spectacular project has underground power house with ultimate capacity of 1,696,000 kva, four million acre-feet usable storage, 300-kv transmission, aluminum smelter

J. T. Madill
Manager, Power Operation, B. C.
Aluminum Co. of Canada Ltd.
Kitimat, B. C.

First stage of the Aluminum Co. of Canada's Nechako-Kemano hydroelectric development has been completed and aluminum is now being produced at the company's new reduction works at Kitimat. This immense project, with a number of unusual features, is located in an area adjacent to the West Coast of British Columbia, about 400 miles northwest of Vancouver, B. C.

The plan, shown by the accompanying map, involves:

1. The large rock-fill Kenney Dam at the eastern end of the 5,700-square-mile water shed to be controlled

2. The reservoir formed behind this dam, having a surface area, when full, of 350 square miles, total storage of 19,000,000 acre-ft and a usable storage volume of 176 billion cubic feet or 4,000,000 acre-ft

3. Ultimately two (initially one) 25-ft-diameter, 10-mile-long power tunnels, which will carry the water from the drainage area westward almost to the western slope of the coast range, whereas formerly it flowed eastward in the Nechako River to the Fraser River, and thence to the Pacific Ocean

4. Ultimately four (initially one) 11-ft-diameter steel-lined penstocks 4,080 ft long, leading from the 10-mile tunnels downward, through Mount DuBose, to the power cavern in this mountain, producing a net head of 2,500 ft. These penstocks will be equipped with 11-ft-diameter butterfly valves at the upper end, and each will divide at the lower end to supply water to four turbines. A 51-in.-diameter spherical valve is located in each individual penstock 140 ft upstream from the turbine

5. A power station having an ultimate capacity of 2,240,000 hp or 1,696,000 kva in 16 units and housed in a hole in the ground 1,135 ft long, 81 ft wide, 134 ft high and located 1,400 ft from the face of the mountain

6. 300,000 v power transmission lines from Kemano to Kitimat, a distance of 49 miles

7. The reduction works at Kitimat, including a high-voltage substation, and rectifier stations for the aluminum smelting and associated operations

8. A port at Kitimat and a town, with all the necessary roads, bridges, services and facilities

A possible ultimate one-line diagram of the main parts of the power system shows the main points of interest to be, at Kemano, sixteen 106,000-kva generators, each connected through a circuit breaker to its own 13.2-kv step-up transformer bank winding. The 301-kv windings of the transformer banks are connected by means of paper-insulated, oil-filled cables to an outdoor switching station having a double bus, with a circuit breaker in each incoming or outgoing connection, as well as bus tie circuit breakers and disconnects.

There are four transmission circuits planned for the first 10 miles up the Kemano Valley to the Kemano Pass switching station, two circuits over the higher part of the line covering the next 10 miles to the Kildala switching

station, and four circuits again for the last 30 miles to Kitimat.

An explanation for only two circuits between the switching stations is that the valleys and pass through which the lines run are narrow and there is space for two tower lines only. Also the terrain is rough, with rapid changes in elevation, with the result that there are few good tower sites. Hence long spans are necessary. Also part of this 10 miles is in an area not covered by timber, making it difficult to determine if heavy icing has occurred even in recent years. If heavy icing does occur (and records from a test span on the pass over four winters show a maximum of only 4 lb per foot of ice), then the conductor strength requirements on long spans are such, and the tower loads become such, that double-circuit lines as used for the rest of the distance become quite uneconomic. It was desired to build a line at least twice as strong as any to date. That is, one able to withstand icing corresponding to a conductor loading of 40 lb per foot. This automatically means that an ACSR cable of economic proportions has a large conducting area. Hence the two single-circuit lines with 2.26-in.-diameter ACSR will have the same current carrying capacity as the four circuits covering the rest of the distance.

The initial stage involves only three generators, two step-up transformer banks, two transmission circuits and three receiving banks at Kitimat, to serve potlines 1 and 2. It may be noted that in this stage no line circuit breakers are used at either end.

Kemano Power Station Equipment

The generators are rated 106,000 kva with a 60 C temperature rise or 122,000 kva with an 80 C rise. They are 0.8 power factor, 13.8-kv, 22-pole, 60-cycle, 327-rpm machines with an overspeed requirement of 610 rpm. The rotor construction is unusual because there is no spider in the ordinary sense of the word. A number of large forged-steel disks are shrunk to the shaft and the poles fitted into dovetails machined into these disks. The generators are being built by three different manufacturers and comparable data are listed in an accompanying table.

The bus connecting the generator to the transformer is 7-in. double-aluminum channel, generally of welded construction, and designed to carry 6,000 amp, as are the low-voltage disconnects.

The turbines will have a guaranteed output of 140,000 hp and an expected output of 150,000 hp at a net head of 2,500 ft, with a discharge of 600 cfs. They are four-nozzle verticle-type impulse turbines being built by three different manufacturers. Comparable data are listed in an accompanying table.

Materials were flown in by helicopter for two 300-kv lines crossing rugged Kildala pass

For a number of considerations, including the hydraulics of the tunnels and penstocks, the minimum needle opening time is 30 seconds. This poses an operating problem when initially two blocks of load of 100 mw must be picked up, one at a time, and carried by as few as two turbines and their generators. This has been solved by a needle preset opening solenoid, controlled from the control room. When the load is ready, the control room operator presses a unit push button. As the needles open and the frequency rises, the governor causes the deflectors to enter the jets, reducing the power and stopping the frequency rise. When the needles have opened to the predetermined position, about 75% of full load, this is indicated by a signal lamp near the push button, and also by the needle position indicator on the instrument board.

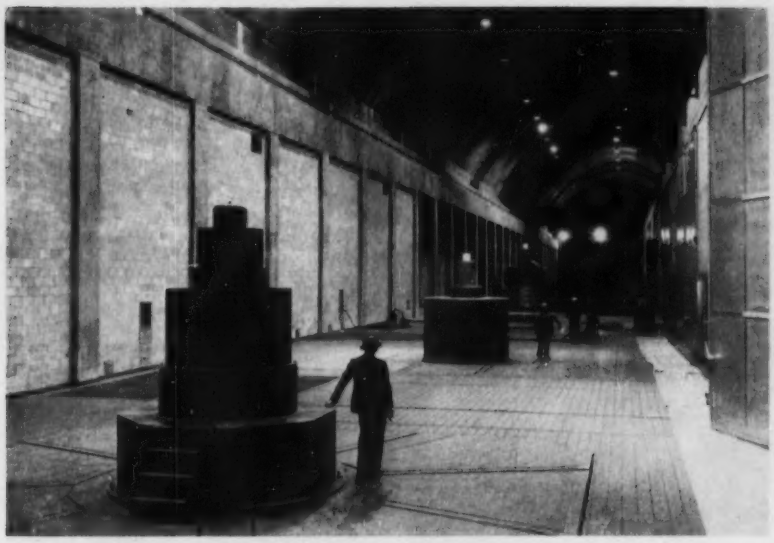
At this point the operator at Kitimat is told to put on the potroom load. As soon as this is done, of course, the frequency drop causes the governor to withdraw the deflectors and the turbine supplies power to the generator. Obviously, the movement of these deflectors has no effect on the hydraulic flow conditions and is accomplished in a very short time interval, not longer than three seconds. Also because of this, load drop does not cause high over-frequency as the accelerating power is removed from the turbine runner very rapidly by the governors operating the deflectors, and the needles can close at a slow rate, about one minute, as set by penstock and tunnel requirements.

The generator circuit breakers presented a problem as a normal current carrying capacity of at least 5,500 amp was required. Only three such breakers were needed but to secure them would have involved development charges, high cost and possible delays and difficulties. This problem was neatly solved using two standard 15-kv 4,000-amp 1,900,000-kva interrupting capacity air blast circuit breakers operating as one electric and pneumatic unit, with one of each of the six poles in each of the six phase leads from the generator, the phase parallels being connected together on the transformer side of the circuit breaker.

This gives an effective capacity of 8,000 amp and provides a most economically attractive solution. Incidentally, since these circuit breakers are indoors, the limited space and the elimination of the oil fire hazard make the air blast circuit breakers almost essential.

The main transformers are nominally 71,000-kva single-phase units, type OFW, that is, forced oil water cooled by means of separate heat exchangers. There are no ratio adjusters on any windings. The ratio is 13.2/13.2/301.4 kv when three units are connected delta-delta-wye with a total bank capacity of 213,000 kva. Either low-voltage winding can carry its full rated load independent of the other. Impulse insulation level of the high-voltage winding is 1,050 kv. This insulation is graded to 15-kv at the neutral point which is solidly grounded. The specifications required a shipping weight of not more than 150,000 lb and this meant single-phase units.

It is interesting to note that it was essential to connect two generators to one step-up transformer bank, if the



Underground station is 1,135 ft long, 81 ft wide, 134 ft high and 1,400 ft into mountain

power station length was not to be dictated by the length of the row of transformers. Transformers were selected with two primary windings instead of one because the only extra cost involved is for a small amount of extra bus and a 2% increase in the transformer price. This is more than compensated for by the reduction in low voltage fault kva from 2,000,000 to 900,000, with a consequent reduction in bus, insulator and disconnect strength requirements, circuit breaker strength and interrupting rating, and extent of damage when a fault does occur.

The transformers are supplied by two manufacturers and are physically and electrically interchangeable. They are each equipped with two 100% coolers. This gives rise to an interesting increase in capacity if both coolers are operated. These data are shown in one of the tables.

Power is carried from the transformer cells in the cavern to the outdoor 300-kv switching station by means of three high-voltage paper-insulated oil-filled cables per circuit. These cables have a current carrying capacity of at least 550 amp. They are of the Pirelli type, that is the oil in the central duct of the conductor is under only very moderate pressure, perhaps 40 psi and its purpose is to serve as an insulating medium only. The cable distance from the transformers to the switching station averages 2,000 ft per phase, and the maximum difference in elevation is 75 ft.

These cables are installed in a special high-voltage cable tunnel, divided into two sections by a vertical wall, with only two circuits in each section, carried on insulated supports with 5 ft vertical distance between circuits and one foot horizontal spacing between cables of the same circuit. The cable sheaths are grounded at the mid-point only to eliminate sheath loss. The cables, their joints and terminations have to meet the same impulse specification as the transformers, that is 1,050 kv with a 1½ by 40 microsecond wave. The two initial circuits are being supplied by two manufacturers.

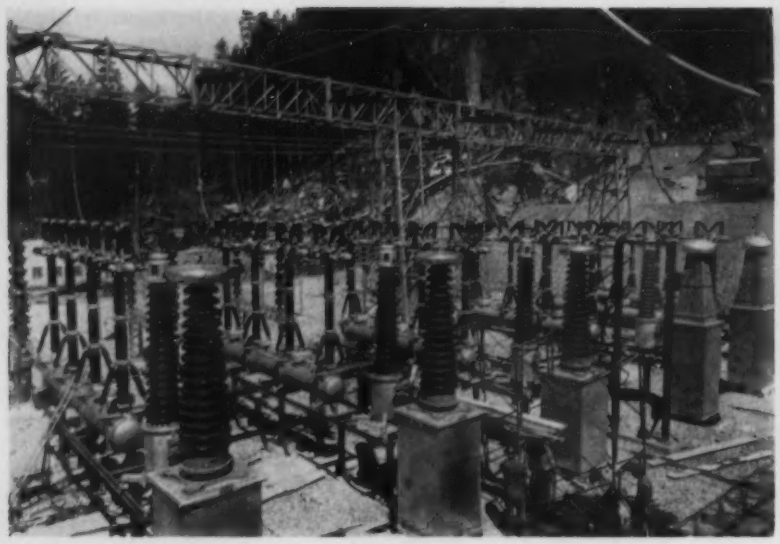
Kemano Power Station Arrangement

Excavation for the power house area from the side of the mountain required provision for pressure conduits, penstocks, valve chamber, power cavern, tailrace, access, high-voltage cable and ventilation tunnels.

A cross-sectional drawing of the

Generator Data

Item	Generator No. 1 Manufacturer Canadian General Electric	2 Canadian Westinghouse	3 English Electric Ltd.
Output kva	106,000	106,000	106,000
Power factor	0.8	0.8	0.8
Field current, amp	1,080	710	1,060
Guaranteed efficiency full load	97.3	97.3	97.45
Guaranteed efficiency ¾ load	96.8	96.8	96.95
Guaranteed efficiency ½ load All at 0.8 pf	95.3	96.0	95.90
Short circuit ratio	1.0	1.0	1.0
Rotor construction	Flutes dovetailed to shaft and laminated ring carrying poles	Disks shrunk on shaft carrying poles	Rolled plates shrunk on shaft carrying poles
Rotor total weight, lb	640,000	658,000	830,000
Rotor diameter, in	174	206	194
Rotor iron length, in	117	90	100
Generator total weight, lb	1,140,000	1,154,000	1,420,000
Generator WR^2, lb-ft^2	16,400,000	23,800,000	23,700,000
Reactance in %:			
X_d	113.2	106.0	105.0
X_d'	28.6	25.0	30.0
X_d''	20.2	18.0	21.0
X_2	24.4	21.5	24.5
X_o	15.0	11.0	15.0
X_q''/X_d''	1.5	1.4	.....
No. of parallels in stator	6	2	2
No. of turns in stator coil	3	1	1
Type of stator coil	Whole coils	Half coils	Half coils
Total vol. of cooling water, gpm	1,560	1,117	900



Switchyard showing air-blast circuit breakers with interrupting capacity of 6,000 mva

power house would show the arrangement of the turbine, the runner removal pit and staging, generator, its circuit breaker, low-voltage gallery, control cable, pipe and high-voltage cable galleries, all of which are located below the transformer vault.

The high-voltage circuit breakers are of the air-blast type and are adequate for the ultimate installation, having an interrupting capacity of 6,000,000 kva on a symmetrical basis at 301 kv, with a rate of rise of recovery voltage of 1,850 v per microsecond. Calculations indicate that with the ultimate development, even with all transmission lines disconnected from the bus, which is the worst case, the rate of rise of recovery voltage will be about 1,200 v per microsecond. With this rate of rise the interrupting capacity is 7,000,000 kva symmetrical at 301 kv. The calculated duty is 6,000,000 kva for a line-to-ground fault between the circuit breaker and the cable termination. Circuit breakers have a current carrying capacity of 800 amp and an impulse level of 1,050 kv. They have an opening time of 5 cycles and a closing time of 6 cycles. The opening or closing d-c from the battery is only 3 amp or less.

The high-voltage disconnects on the units are quite standard but the line disconnects are unusual. They have a current rating of 1,600 amp and are equipped with interrupters in parallel with the main blade, which are capable of interrupting 90 amp line charging current at 300 kv, or a load current of 800 amp with 60 kv across the disconnect, several times before contact erosion becomes serious. Thus, it is possible to switch the transmission lines without circuit breakers.

Kemano Transformer Data

	Manufacturers	
	English Electric Co. of Canada	Ferranti Ltd.
1 Cooler operating:		
Kva	71,000	71,000
Temperature rise, °C	55	55
Cooling water, gpm	170	220
2 Coolers operating:		
Kva	95,000	93,000
Temperature rise, °C	62	62
Cooling water, gpm	266	440
Reactance, LV to HV, %	10.5	10.7
Exciting current, %	1.75	1.00
Shipping dimensions: length, in.	204	214
width, in.	128	116
height, in.	186	170
No load loss, kw	156	90
Load loss, kw	395	375
Guaranteed efficiency, 1.0 pf		
Full load, 71,000 kva	99.22	99.35
¾ load	99.29	99.43
½ load	99.28	99.47
Oil, Imperial gal	7,220	6,380
Weight of oil, lb	62,000	55,000
Weight of core and coils, lb	116,000	122,000
Weight of tank and fittings, lb	50,000	58,000
Total weight, lb	228,000	235,000

Turbine Data

Item	Turbine No. / Manufacturer	1 Canadian Allis-Chalmers	2 Vancouver Engineering Works	3 Dominion Engineering
Guaranteed max. output, hp		140,000	140,000	140,000
Expected max. output, hp		147,000	150,000	158,000
Expected max. discharge, cfs		575	590	625
Guaranteed max. efficiency, %		89.5	90.0	89.5
Expected max. efficiency, %		92.5	92.0	91.5
Expected efficiency at full load, %		90.2	89.5	88.8
Expected efficiency at ¾ load, %		92.5	92.0	91.5
Expected efficiency at ½ load, %		91.0	90.5	90.1
Shaft weight, lb		48,000	57,000	47,000
Runner weight, lb		72,000	89,900	48,000
Runner diameter, in.		160	162	162
Total turbine weight, lb		565,000	676,000	708,000
Buckets formed by		Forging	Casting	Casting
Bucket material		Steel plate	Mild steel	13% cr. steel
Bucket fastening		Welded to disk	2 fitted bolts	Cast with ring
Type of runner		Integrally welded	Bolted	Integrally cast
Bearing		Self-lubricated	Pressure-lubricated	Self-lubricated
Governor manufacturer		Woodward	Pelton	Woodward

Here is how one manufacturer

Meets Engineer Needs

Competition is so keen for engineering graduates that industries must pursue an active recruiting program if they expect to fill their needs. So said Clarence H. Linder, vice-president in charge of engineering, General Electric Co., New York, who recently made a trip to the West Coast to visit its universities. At a press conference in San Francisco Linder discussed the increasingly serious shortage of technically trained workers and suggested some solutions. Linder spoke as follows:

General Electric is currently able to hire only 50% of its engineering manpower from colleges. Estimates on the current engineering shortage vary from 10,000 to 35,000, with 20,000 as probably a reasonable figure. With engineering schools turning out from 17,000 to 18,000 graduates a year, this means the country is a year behind in its supply of engineers.

The problem is aggravated by two facts. First, there are 5,000 companies now competing for graduates as compared with only 500 in the 1940s; and second, industry is now using a much higher percentage of technically trained employees in proportion to total employees than formerly. For instance, at General Electric one out of every 15 employees now is technically trained, which means he has a college degree or above in engineering or science. The current national average for all industry is one technically trained employee for every 60 employees, a ratio of 1 to 60, which compares with a 1900 figure of one technically trained employee for every 250 — a ratio of 1 to 250. In General Electric there are currently 16,000 employees with technical training.

Last year the company hired around 900 technically trained college graduates directly from colleges. Excluding various specialty groups, such as mining and civil engineers, this means that it hired 10% of the total number of technically trained graduates available —the largest number to be hired by any company.

The crux of the problem of getting technically trained people for industry lies in interesting students in technical careers while they are still in high school. It is in high school that they must get the scientific and mathematical background to qualify for admission to technical schools.

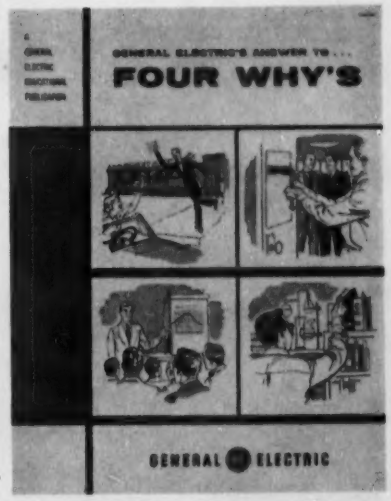
The company is making a great effort to get more high school students interested in technical careers. It puts out many publications for high school students, such as "Why Study Math?" and "Why Study English?" These publications, available without charge to schools upon request, explain to the students the kind of background they need for technical careers and the opportunities they offer.

Each summer G-E sponsors a six-week expense-free summer fellowship program for high school science and mathematics teachers at colleges near company plants. The teachers hear lectures by outstanding college professors in science and mathematics, and spend considerable time in the plant and plant laboratories observing how science and math are put to use in modern industrial operations. Last summer 200 high school teachers took advanced study under this program.

The company feels there should be more emphasis on science and math, the humanities and social sciences in engineering training on the college level. Training should be in the broad general principles on science and mathematics, rather than in current engineering practices, which will soon be out of date. Engineering training should emphasize problem solving.

A related problem is the severe national shortage of science and mathematics teachers in secondary schools—7,000 in New York State alone. Reasons for this teacher shortage are: salaries are too low to attract capable trained people to the profession; many states require courses in pedagogy as prerequisites for teaching that many people with good technical backgrounds have not the time or money to take.

There is an ever growing need in industry for people with advanced degrees in engineering and science. With technology building up at a terrific rate and becoming ever more complex, industry has the problem of absorbing this technology in productive ways. People with a high degree of training are needed to do this. At General Electric, the number of PhDs in science, engineering, physics and math has increased 20% this year.



Several booklets of this type encourage high school students to take college training

Industry itself has two responsibilities in connection with technically trained people:

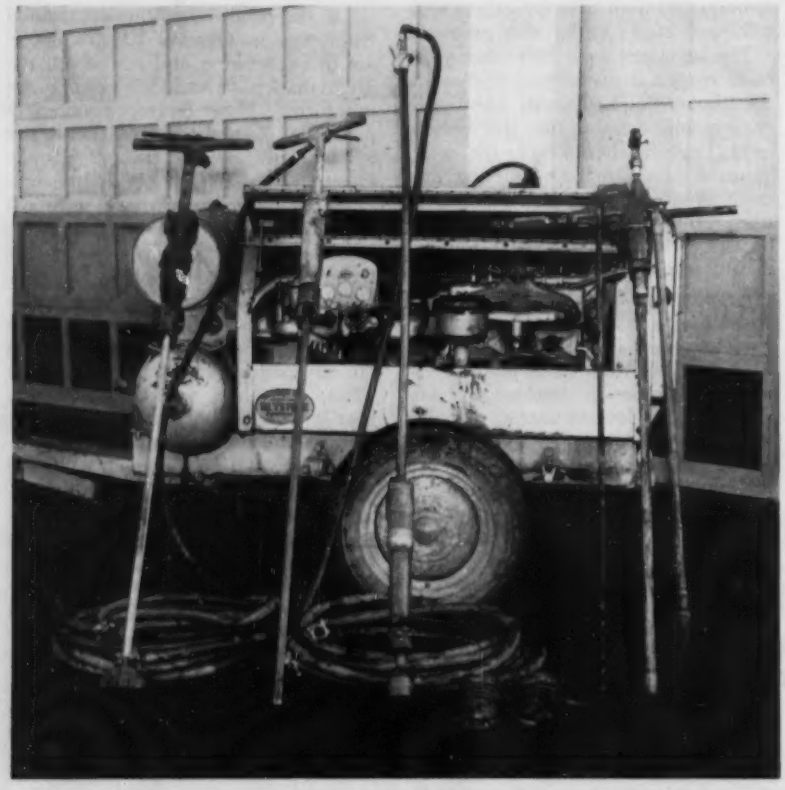
1. To put them in positions where they utilize their training and skills.
2. Make sure that every problem is assigned to men with adequate competence and training.

Of the 16,000 technically trained employees in General Electric, 60% are in engineering and research, 25% are in marketing and 15% are in manufacturing. These figures are cited to point out how many are the routes open to technically trained people. Over 50% of the people in management in the company have technical training.

There are great opportunities for technically trained people in the electrical industry alone. If the industry has been doubling its production every 10 years, it means it will have to turn out as much as it has in the past 75 years, and there is every indication that it will. Such tremendous expansion means almost unlimited opportunity for young people with technical training.

The company feels "deeply committed" to give additional training beyond college work that may be needed by the men it hires, Linder said. A three-year advanced course in engineering and a two-year course in creative engineering are given to selected recruits. Linder feels that such courses as these, which give a kind of training that only the company can give, have greatly sharpened the skills and raised the level of technical people in the company.

Air tamping by cold crews contributes to lower pole setting costs besides doing a better job. Note the safety metal shoe guards



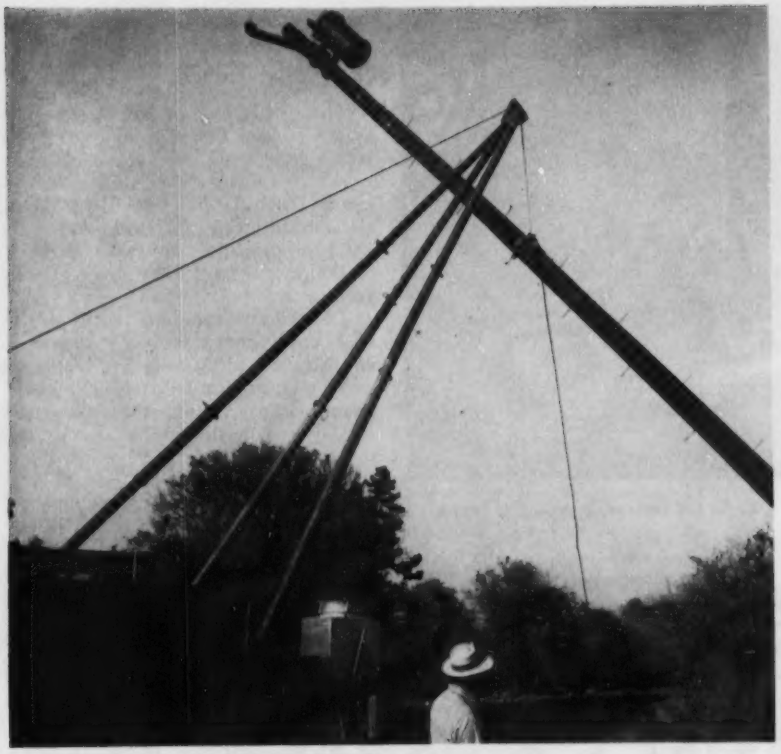
Air compressor with pneumatic tampers, spade, auger and hammer is rotated among jobs

Cold Crews

Use of "cold" crews that do line work only on de-energized equipment is a new practice with Southern California Edison Co. that is meeting with success. Edison has found that use of cold crews on the proper types of jobs results in increased economy, efficiency and speed.

A number of these crews are in the field. In addition to building complete distribution lines, including services, they also construct street lighting systems in new areas. The cold crew idea seems to be the answer to keeping pace with demands for services in mushrooming subdivisions, which for years have been resulting in new "cities" of homes almost overnight.

These cold crews are used most advantageously where the job is large, where practically all work can be done on a cold basis and where a considerable amount of pole setting is involved. Poles are completely equipped, including transformers, before they are set and in some cases the wire is strung on the ground and erected with the pole. Among the most important features of the cold crew system, however, is the



Poles are set completely framed, including transformers. Wires are sometimes raised too

Speed Line Work

use of certain tools and labor-saving devices and practices.

In the field of mechanization, these things have been done:

1. An air compressor has been mounted on a pickup truck and is rotated among three cold crews.

2. Such operations as tamping in poles and anchors are now carried out with a degree of speed and quality not possible with former manual operation.

3. An air-driven spade is used in installing butt blocks necessary to support poles installed on the perimeter of subdivisions. These poles are also tamped in by air, using a special-size tamping butt.

4. Portable electric generators used by standard Edison crews are also used by the cold crews.

5. In addition to the use of the wood drill and Impactool for tightening nuts, an electric hammer is used. This has been equipped with a special chuck, and ground rods are driven with ease in the hardest ground.

The process of experimentation and shaking down of tools and procedures is still in process but several facts are now clear.

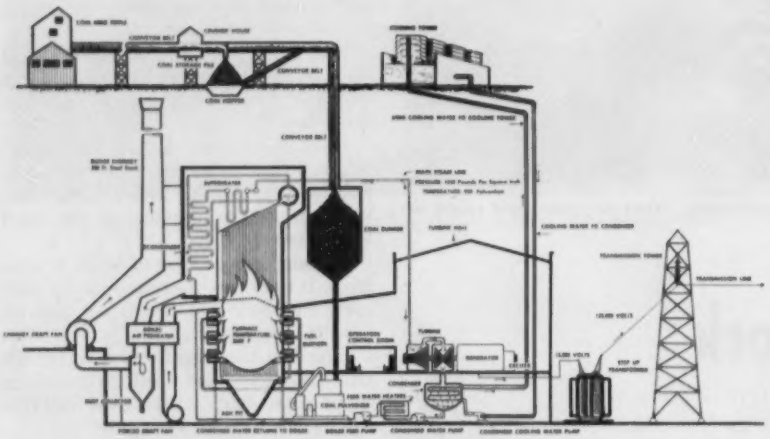
First, these methods provide worthwhile experience for the beginner. Foremen of regular crews have commented on the quality of the men transferred to them.

Second, the quality of work is very high. It has been impressed on the cold crew foreman that this is not just an idea to save money.

Third, a comparative study reveals that completed job costs are much in favor of the cold crew method for large subdivision or tract jobs.

Mechanization includes air-driven spade for installing butt blocks, electric hammer for driving ground rods and butt block tamper

To save fuel transportation costs Utah Power & Light Co. built plant on top of coal mine



Schematic cross section of Carbon steam-electric generating station, Castle Gate, Utah

Sits on Top of Coal Mine

First modern steam plant to be located in the heart of the coal fields of Utah is Utah Power & Light Co.'s 66,000-kw Carbon plant, unit No. 1, scheduled for commercial operation in December of this year. The plant site is in a rough barren canyon at the junction of Willow Creek and the Price River at Castle Gate, Utah. Castle Gate is a coal mining town about 50 miles southeast of Provo, Utah, on U.S. Highway 50 and along the main line of the Denver & Rio Grande Western Railroad.

Prime considerations in locating the Carbon plant were to save in fuel transportation costs and to better serve the growing load in east central and south eastern Utah. The new plant is connected to the existing Utah Power & Light Co. system by 130,000- and 44,-000-v lines.

The plant site is enviable with respect to availability of fuel. Coal may be hauled by railroad or trucks from the many nearby mines in Carbon and Emery Counties. Engineering is also complete on a 1,700-ft, 200-ton-per-hour belt conveyor from the Independent Coal & Coke Co. mine tipple to the Carbon plant. This conveyor will be installed when, and if, the mine operations and fuel and transportation costs justify the investment.

In order to lower fuel costs further, investigation is nearing completion on blending inferior products of the coal mining operations heretofore wasted with the fine grade coal produced at the mines.

The basic plant design is on a unit system: one 620,000 - lb - per - hour steam generating unit; one 66,000-kw nonreheat turbine-generator unit designed for 1,250 psig and 950 F throttle conditions and 2.5-in. Hg absolute exhaust pressure, and one FOA-T 75,000-kva 13.8/130-kv main transformer.

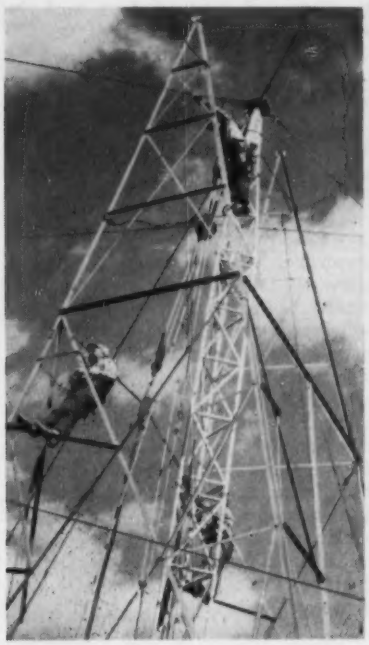
To take maximum advantage of the fuel supply, many problems were successfully solved in designing the large plant within a limited space in rugged terrain. For example, it was necessary to locate a settling basin about 1½ miles upstream on the Price River on the opposite side of the town of Castle Gate. This basin is large enough to provide 2,500,000 gal of water in the event of interruption of river flow. From the traveling screen at the outlet of the settling basin, water is fed by gravity through an underground 12-in. line to a raw water sump at the plant site. This water is used for cooling tower, boiler makeup and service water. Domestic supply is obtained from the Castle Gate system. A feature of this plant is that two wells have been drilled about 14 miles upstream from Castle Gate that will supply the Price River with the makeup and service water used at the plant.

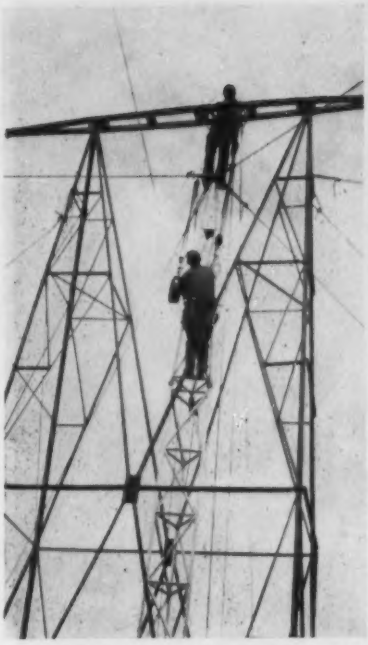
The cooling tower is located on an adjacent hill about 80 ft above the operating level of the station building. A foot bridge from the boiler structure and a road of approximately 15% grade allow access to the cooling tower area.

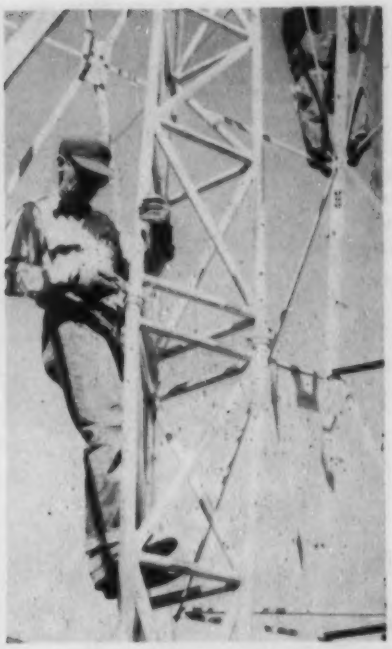
The site is bounded on the south by steep sandstone cliffs that rise some 120 ft above the canyon floor. Test drilling in the canyon indicated moderately firm sandy loam soils with rock fragments and boulders. The firm soils were also interspersed with pockets of weak silty loam material. Although a rigid mat would provide a feasible means of foundation support, it was decided to cut away part of the rock bluff to permit moving the No. 1 unit to a solid rock foundation, providing more room for a future No. 2 unit.

The above outlines just a few of the unusual features of the Carbon plant. Bechtel Corp. of San Francisco is engineer and constructor of the installation working in cooperation with the engineering department of the Utah Power & Light Co.

The coal reserve of Utah is estimated to be about 100 billion tons. To give a better picture, this coal, if converted into electrical energy, could serve the present load on the Utah Power & Light Co. system for 100,-000 years.







Quickly assembled light-weight sections of fabricated aluminum gin pole for tower erection are easily transported over mountains

Aluminum Gin Pole Saves the Day

Where much of the real estate is perpendicular, as it is in the Colorado Rockies, transmission line construction and maintenance present interesting and difficult problems. The transmission department of Public Service Co. of Colorado began successfully using a comparatively new type commercially manufactured gin pole this summer on its Shoshone 115-kv line reconductoring project.

While in the process of replacing 46-year-old hemp-centered copper conductor with new steel-centered aluminum, company engineers decided to raise some of the towers and relocate others to get the line farther away from possible snow and rock slide trouble spots. Their problems arose from the fact that most of these possible trouble spots were also the more inaccessible locations. The gin pole shown had much to do with alleviating expensive and difficult tower work.

Comparatively light in weight, the 12-ft aluminum alloy sections of the gin pole can be handled easily on steep slopes where transportation to a tower is a major problem.Most of the time gin pole sections are hauled on a trailer behind a bulldozer to the work area, but they are also light enough to be carried in by the line crews when necessary. The new gin pole replaces a wood pole that was much heavier, a difficult length to handle, harder to work from, and that had to be set in the rocky ground before construction started. Transmission crews say they can erect a tower in half the time required with the old method.

About 150 miles of Shoshone line have been reconductored as the season draws to a close this year, leaving only about six miles to complete. The job was undertaken back in 1934 on a kind of "second priority" basis and has been continuing since with interruptions ranging in length from seven years during World War II to one-year stops when other projects were more essential.

Linemen like to work from aluminum gin

The hemp-centered copper conductor that is being retired is coming off the towers in amazingly good condition, considering its 46 years of service in areas noted for extreme temperatures, ice and lightning. Over the higher passes, such as 13,700-ft Angentine, the conductor is still copper. As the work progresses, with new and higher towers in strategic locations as well as new conductor, transmission line outages are diminishing.

Footings for 18 new towers were dug during the summer this year, replacing those that were too low. The new gin pole is at work raising those new towers now that the heavy summer system load is over, allowing the crews outage time on the line during working hours each day. Work will cease within the next few weeks when winter weather sets in permanently in the high country and it is hoped that the job will be completed by then.

Ultramodern 23-story Mile High Center office building provides the new look as . . .

Denver Takes to the Sky

Denver is taking to the sky in a commercial building expansion program that is altering the whole complexion of this mile-high metropolis of the Rockies. First of several multimillion-dollar projects to take form is the Mile High Center development at 17th and Broadway across the street from the historic Brown Palace Hotel.

Mile High Center, a $16,000,000 joint venture of Webb & Knapp Inc. and the George A. Fuller Co., owners and builders, will be dominated by a 23-story ultramodern office building, just completed, known as the 1700 Broadway Building. Other structures on the 301x266-ft site will be a three-level Transportation Building with cylinderical thin-shell roof and a four-story bank building, which are now under construction. A parking garage, to be built across the street, will be connected to the Center by a tunnel.

The Transportation Building will be used as an arcade for high-class retail shops and will house a large cafeteria on the lower level, with a luxurious dining room on the Broadway level, which overlooks a trout pool running 200 ft between the 1700 Broadway and Transportation Buildings.

There are many features of the office building of interest, besides its electrical facilities. The 23-story skyscraper rises to its full height without setbacks, except for two penthouses for mechanical equipment. It is 127x152 ft in plan, with columns spaced 20 ft center to center and 11 ft 2 in. floor-to-floor height. A service core containing two stairways, elevators and toilets is located in the center of the building, leaving complete perimeter area available for rental. The building is served by four low-rise and four high-rise elevators.

Air conditioning is always an important consideration in determining the character of the outer walls of a building but never before has it dictated the nature of a building exterior to the extent it has for the 23-story office building in Denver's Mile High Center. Air conditioning made necessary a well insulated enclosure for this skyscraper. The architects decided to allow the air conditioning system to determine facade appearance.

To carry out this idea, they followed the outline of perimetric air conditioning units and risers with light colored opaque bands and employed dark colored bands to delineate the structural steel framing of the building. Between these bands are glass windows. The light colored bands are insulated sandwich panels only 1¾ in. thick. No backup was required for additional fire resistance. The dark panels are backed up by the concrete fire protection of the steel frame.

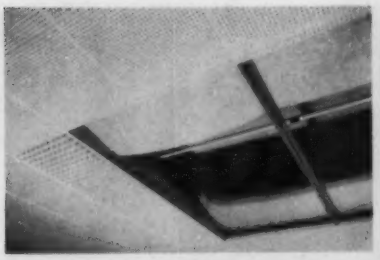
A considerable sacrifice of potential rentable space was made by the builders, to create an atmosphere of beauty and spaciousness. The main structure was erected 25 ft back of the property line, which placed the impressive entrance 50 ft beyond the public sidewalk area. The walks connecting the office building with adjoining structures and the open area under the building at the first floor level are equipped with underground snow-melting coils. A heat-transfer oil circulates in the pipes, eliminating the need for controlling antifreeze solutions, which were used prior to this type of installation.

Soft music pervades the outer plaza and arcade areas, and it is planned to provide music by Muzak in the elevator cabs.

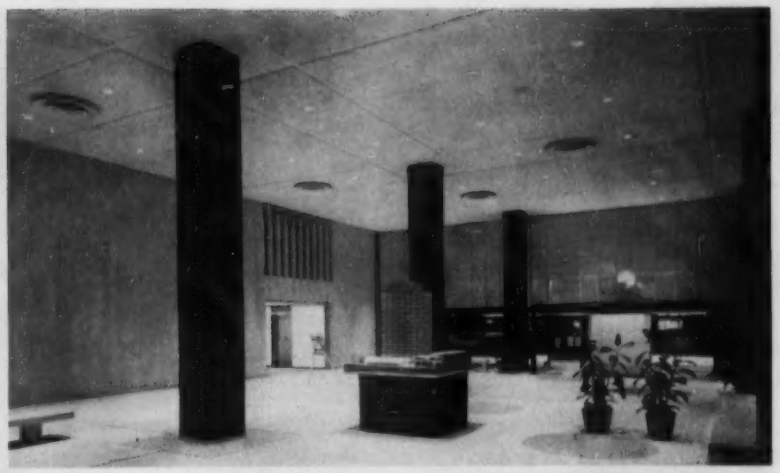
Electrical and communication facilities have been provided in the outer arcade area so that radio broadcasts, Christmas Carols or live television shows may be put on. For Rocky Mountain atmosphere, the pine trees, spotlighted at night, were planted inside the sidewalk line.

The main elevator lobby and elevator cabs are lighted by the use of Ty-Glo, an attractive new woven aluminum mesh that leaves a striking and solid appearance. Both cold and hot cathode fluorescent lamps are used above the mesh. The W. S. Tyler Co. of Cleveland, Ohio, manufacturer of this patented product, has received praise from everyone who has seen these ceilings. Century downlights are prominently used for the higher ceiling lobby and plaza lights.

Also planned is an outside temperature indicating thermometer to be installed on each floor of the building.



Flush-mounted fluorescent lighting fixtures are provided with 8-ft cords so that they may be moved sideways or at right angles in metal-pan fiber-glass acoustical ceiling



Recessed downlighting highlights the attractively appointed main lobby of the building

All floors of the 1700 Broadway Building have a modern double duct G-E fiber underfloor system for high and low tension wiring, to provide close, neat underfloor connections.

Approximately 5,000 Globe 1x4-ft, three-lamp fluorescent troffer fixtures are installed in a National Gypsum Co. metal pan ceiling. This type of lighting makes a pleasing appearance because of the flush mounting. Average intensity is 40 f-c. Strip lighting 6 in. wide by 32 ft long was used in typical elevator corridors.

A master RCA-TV antenna system is installed, to serve any tenant desiring this service. All equipment rooms and the building superintendent's office are connected by automatic telephones.

As a service to tenants, the building will maintain a law library provided with dictating equipment so that stenographers will not have to be called or lengthy longhand notes made. If the tenant does not have suitable transcribing equipment, the building will have equipment to lend.

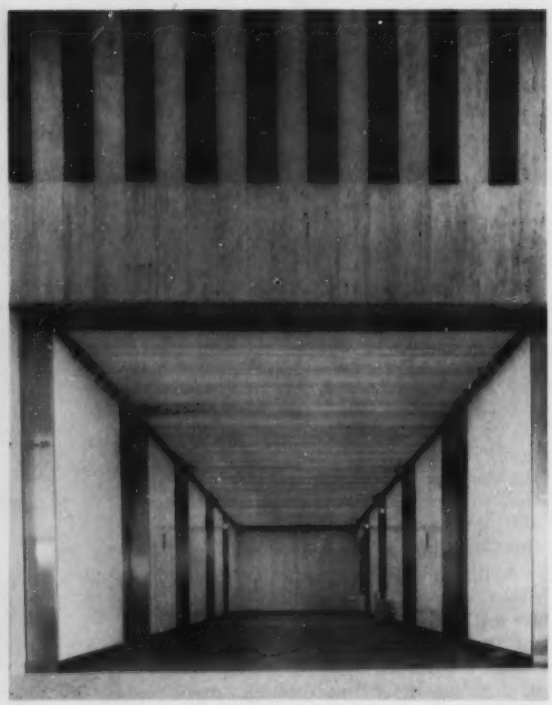
This building has its own steam generating plant for heating, which consists of four 10,000 lb/hr Titusville boilers, which are completely automatic, burning natural gas as the major fuel, with oil as stand-by.

According to William N. Hurst, construction superintendent on the Mile High Center project, the design and engineering features of the entire center were carefully planned to provide an adequate and reliable electrical installation. This planning included all the electrical requirements now demanded by a modern structure and at the same time an economical design from an investment standpoint. Hurst claims nothing extraordinary in the electrical planning other than "good thinking."

The Mile High Center electric load required the Public Service Co. of Colorado to install six 750-kva transformers for combined power and light, fed by three 13.2-kv feeders. These are located in six separate large vaults

Elevator lobbies other than first floor have long strips of recessed fluorescent lighting

Typical floor lighting showing recessed fluorescent fixtures supplying 40 f-c average



Perimetric air conditioning units (left) are individually controlled. Luminous ceiling of basket-weave aluminum mesh is brand new

Impressive egg-crated entrance canopy is attractively lighted with hooded downlights

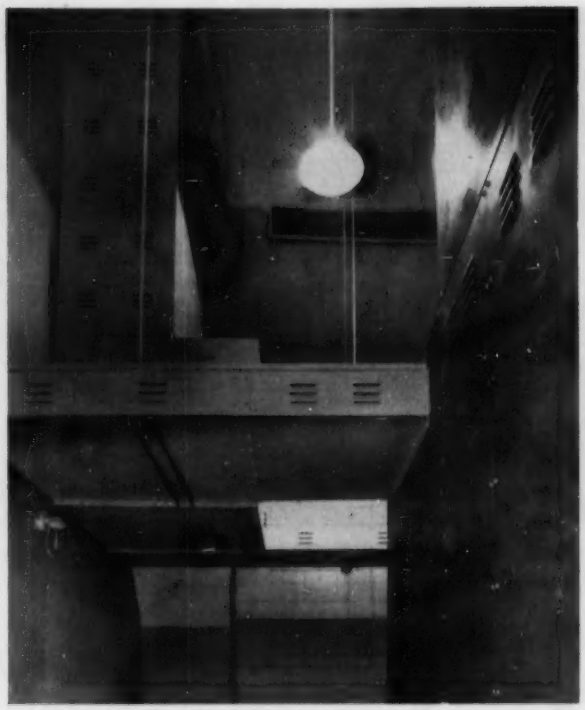
under the sidewalks and outside the foundation walls. Ventilation is through accessible gratings. Transformers are of the submersible type and are not affected by excessive quantities of water resulting from weather. Current on the house side is three phase, 60 cycle, 120/208 v.

A Federal standard bus is used for carrying service between the power company network transformers and main switchgear, also furnished by Federal. The distribution equipment consists of three sets of main switchgear, subdistribution board, lighting and power panels.

An unusual feature of the power installation is the fact that the 208-v secondary is stepped up to 2,400 v through two Sorgel dry-type step-up transformers, to operate two 800 hp and one 200 hp York refrigeration machine motors. Roller-Smith breakers are used in the main Federal switchgear. Conduit and wire are commonly used for all feeders. The cost of bus compared to wire was not worthy of consideration on this project.

Eight Westinghouse Selectomatic automatic elevators, with four cars operating at 600 fpm and four at 800 fpm, serve the building. One hydraulic rotary lift is installed to handle freight. All motors, controllers, starters and related equipment are practically 100% General Electric.

All exits, stairs, elevators, alarms and

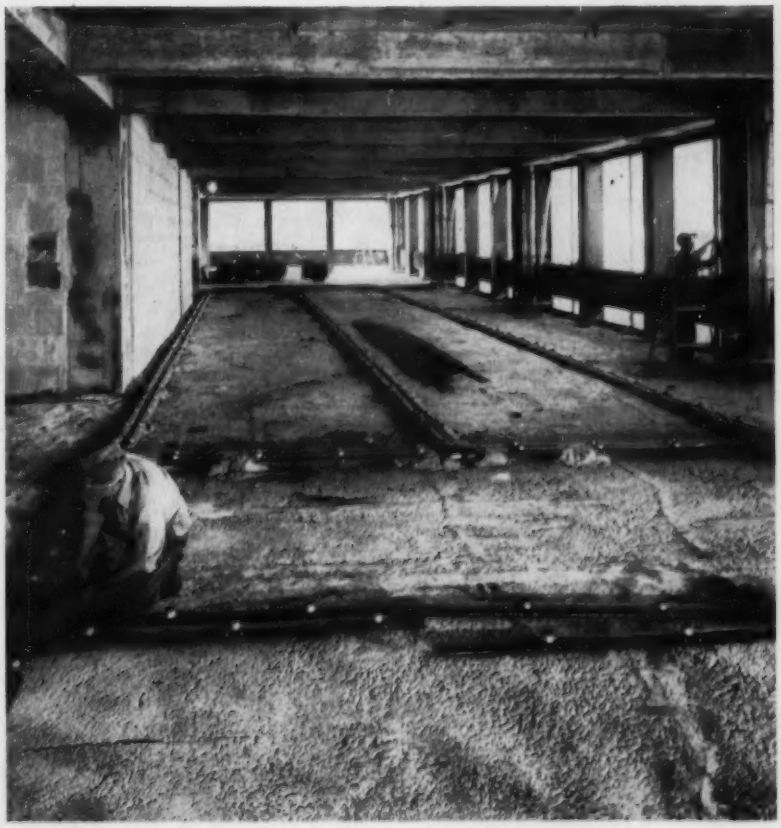


Aluminum duct (left) houses main buses feeding distribution panels (right). Wire and conduit proved most economical for risers

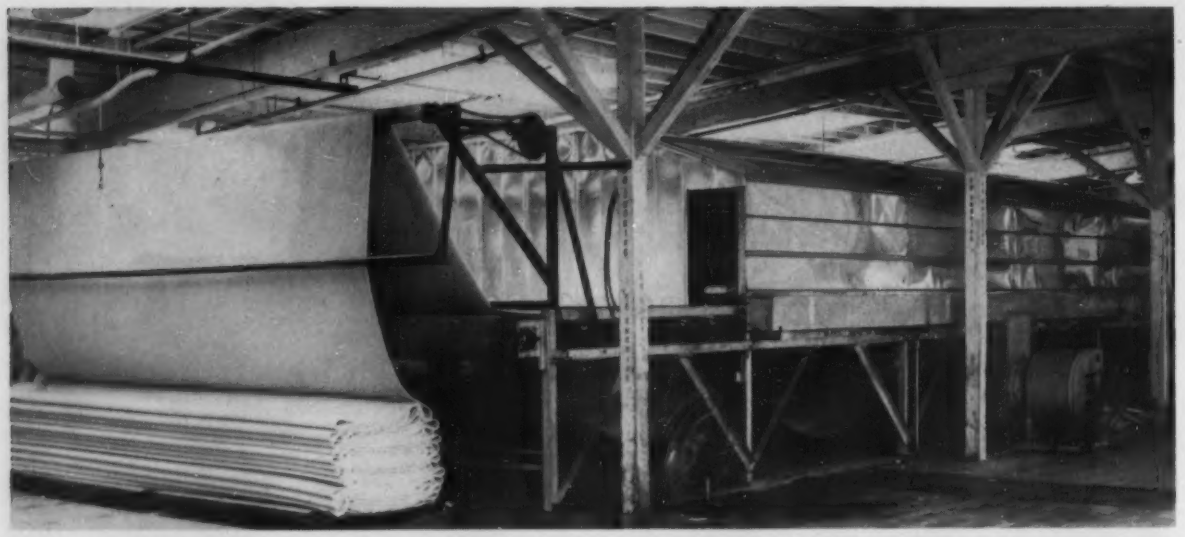
the PAX telephone system are wired on emergency circuits. Automatic controls are used extensively for operating air conditioning, ventilating, heating and snow-melting systems with related running pilot light stop buttons for fire control.

Design of Mile High Center was the work of the Webb & Knapp architectural division under I. M. Pei, director, with U. J. Franzen as project architect and Eason Leonard as architect in charge of field supervision and coordination. Kahn & Jacobs of New York City and G. Meredith Musick of Denver were associate architects. For Fuller, the job is under the supervision of M. J. Grogan, vice-president, with John Layter construction manager and William Hurst construction superintendent. Severud, Elstad, Krueger are the structural engineers. Jaros, Baum & Bolles, mechanical engineers, designed the air conditioning system. Fishbach & Moore of New York City and Sturgeon Electric Co. of Denver were the electrical contractors.

Bethlehem Steel Co. erected the steel frame. Installation of the facades was carried out by the Universal Corp., with porcelain-enameled panels fabricated by the Texlite Co. and aluminum panels by Bohn Aluminum Co. Westinghouse Electric Corp. installed the elevators, which are designed to be operated either with or without operators.



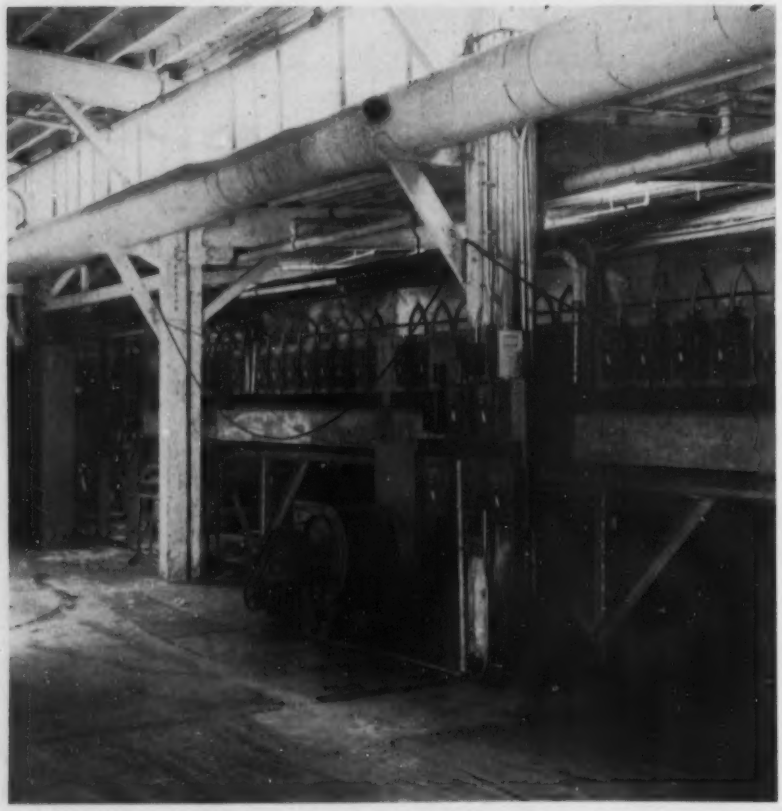
Workman assembling fiber underfloor duct for electrical and communication circuits



Custom-built electric radiant heating oven for drying the plastic emulsion coating applied to the back of cotton-loop carpeting

Infrared Cures Coating

Louis E. Anderson
Industrial Heating Consultant
Los Angeles Department of Water & Power



Twenty-eight 30-amp switches control three-phase 480-v power to 12 heating units each

A custom-built radiant-heating oven for drying the plastic emulsion coating applied to the back of cotton-loop carpeting has been installed recently by the Adamo Co. of Los Angeles. This coating makes the carpets nonskid, and, at the same time, keeps the loop pile in position. Applied as a liquid, the moisture must be driven from the emulsion before the carpeting can be rerolled.

The oven chamber shown is 20 ft wide, 32 ft long and contains 336 1,250-w Corona, 240-v, 4-ft Pyrex glass tube heating elements backed by Alzak aluminum parabolic reflectors. The heaters are paired and connected in series across 480-v service lines.

To obtain greater temperature control, the speed with which the material moves through the oven is adjustable, as is the distance between rug and bank of heaters. An exhaust system draws the moisture-laden air from the oven.

The Pyrex glass enclosing the heating elements is a safety feature that permits the units to be placed close to the work for increased efficiency. Since the tubes operate at atmospheric pressure, there is no danger of explosion or implosion. A temperature of 310 F is normally attained with a conveyor of 16 fpm.

Carpeting in continuous lengths and up to 18 ft wide is satisfactorily handled by this oven.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Sewed up tight

Despite vigorous protest from several chapters in the West the constitutional changes were voted in by a big majority at the annual convention of National Electrical Contractors Assn. at New Orleans, Oct. 26-30. It may be the last time members vote at a convention for they elected to turn over to the board of governors their votes on all future officers and changes in by-laws, dues, policy, finances. Makes a compact governing set-up but hardly democratic; more the way some unions operate than an association.

Contest

Phil Robbins of Salt Lake City was elected vice-president for District 8 in the contest between himself and Charles Simpson of Cheyenne, the incumbent. Wesley Grasley of Portland was uncontested electee for District 6 vice-president, succeeding Edgar L. Buttner of Oakland.

More to come

Other news of the huge convention had not yet trickled back with the tired delegates. The dues change, delegation of voting power to governors and the elections were the main controversial issues. Business development, codes and standards, research and education, governmental affairs, labor relations and apprenticeship training programs of NECA were presented. Charles E. Grandey of Federal Trade Commission addressed the final general session.

Across the bay

An Eastbay Branch of the Electrical Industry Bid Depository of San Francisco is being opened in Oakland in November. It will be operated by A. E. Rowe who is custodian of the San Francisco depository.

First in line

Negotiations on changes to the labor agreement come first in Fresno and the East Central California Chapter, NECA, held its first discussions at its Oct. 21 meeting to determine proposals the chapter will ask of the union local.

Satisfied

Nothing controversial came up at the hearings in Los Angeles and San Francisco last month held by the California Department of Industrial Safety on proposed revisions to the Electrical Safety Orders. In fact the two meetings adjourned before noon. Next step is the publication of the revisions and their circulation to interested parties and final adoption by the Safety Board. They will become effective about Jan. 1, 1955.

Outlook bright

Building continues to be brisk, especially in the housing field, as the FHA terms have been lengthened and down payments reduced. The prospect is for continued good to even better building activity this winter, weather permitting. With national elections over, any uncertainty should fade away. Both parties are committed to stimulating business activity, the difference being in who is to do it—government or private capital. Competition remains keen for every job, with lots of bidders.

Except in copper

The long copper strike has created shortages in wire that may slow deliveries and perhaps up the price. Anaconda's long strike finally ended and Great Falls wire mill went back into production.

Another does it

Financing of residential wiring with payments on a monthly installment basis as part of the regular electric service bill has now been officially announced by Washington Water Power Co., at terms similar to FHA. The program was announced to a series of dealer and contractor meetings. Designed primarily to finance installation charges on appliances, it nevertheless is applicable to fixture installations and home rewiring. The company also told dealers and contractors it was going to sell Precipitrons for residential use direct to the customers, to establish a market.

Heat is on

Electric heating will be promoted again by Pacific Gas and Electric Co., it told a meeting of manufacturers' reps, distributors and contractors Oct. 28. January ads of the company will feature electric heating in 300 newspapers, 355 poster boards, 1,000,000 bill stuffers and 2,500 truck banners. Dealers in heating equipment are invited to display on company office floors. Attention was called by John Ross to financing plans for installation of wiring and heating available from several banks.

Bank plan

Bank of America in California now includes rewiring in its home modernization loans on a nonrecourse basis, the same as it does for weatherstripping, insulating, painting, redecorating, plumbing and new furnace installation. It requires no down payment and monthly terms over a maximum of 36 months. Interest rate is higher than FHA Title 1.

Ungrounded water?

Electrocution while swimming in the Thunderbird Hotel pool has brought a demand for stiffer regulation of the wiring around swimming pools in Nevada. A Long Beach lineman, Douglas Havard, was killed and his companion, Walter Malang, received a severe jolt when attempting to rescue his unconscious friend. All pools in the area were closed until inspected and put into safe condition.

Code

National Fire Protection Assn. announces publication of national fire codes in six volumes at $6 per volume. Vol. V is the National Electrical Code plus six other NFPA electrical standards, 672 pages.

Deserves praise

NAED's first annual convention under the new plan is reported on pp 100-102 but it is notable that it was Bill Jewell's first convention since he took over as Pacific Zone secretary-manager. He handled it like a veteran.

Air cleaner

Another maker of electrostatic precipitators, Radex Corp. of Chicago, announces a new Dustronic unit to absorb 99% of dust, pollen and other matter in the air to be attached to any forced-air furnace. A previous model was designed for use in a single room only. It filters the unheated or return air.

New owner

Leon Hampton, Longview, Wash., has purchased the late T. L. Rosenberg's family interest in the T. L. Rosenberg Co., Oakland industrial electrical contracting firm. The firm will continue under the Rosenberg name, Hampton dividing his time between his Longview and Oakland businesses. Hampton has been known in Longview also for his representation and installation of the Protectowire fire alarm system. The present Rosenberg organization will remain intact, he says.

Pioneers pass on

Two well known old-timers in the electrical construction field died last month. Albert LeRoy Stone, who retired and closed his business, Stone Electric Supply Co. in Los Angeles, last year, died Sept. 30. He was president and treasurer of the Los Angeles Chapter of NECA, vice-president of NECA for 10 years and lately an honorary member . . . Sam Russell, manufacturers' agent and owner of H. B. Squires Co., San Francisco, died Oct. 14. At one time or another he has handled a great many of the well known lines for eastern factories.

Growth does it

They've moved—Afton Lemp Electric Co., wholesale distributors in Boise, moved to its own building at 620 S. Ninth St., Oct. 11. . . . Okonite Co.'s Pacific Coast office moves from the Russ Building to 701 Phelps St., San Francisco 24, by the end of November, I. W. Borda, v-p, says . . . Eichorn & Melchior moved from 501 Indiana to 500 Minnesota St. They are manufacturers' reps . . . Valley Specialties Co., owned by Jim Shirreffs and Junior, has moved from Van Nuys to 1105 S. La Brea Ave., Los Angeles 19.

Heard of these?

News of people: Bill Wilt, Bussmann Mfg. Co. representative in Los Angeles, retires Jan. 1 and A. O. "Chick" Alderman, Pacific Coast manager, moves from Seattle to Los Angeles to make headquarters there. Tom C. Strauser will represent Bussmann in the Northwest . . . Lewis R. Knerr announces his entrance into consulting electrical, civil, mechanical and public utility engineering with offices at 600 16th St., Oakland . . . Lance Robson, inspector of electrical energy. Province of B. C., Canada, was elected president of the Canadian Section, IAEI, recently. W. J. Brake of Regina, Saskatchewan, is vice-president . . . A. L. McLure was named sales manager of the electric supplies department of American Factors Ltd., Honolulu . . . Frank H. Bran Co. has been sold to Stanley Tickle as Frank Bran retires. The San Francisco office has been closed . . . A. I. Benedict, retired lighting engineer, San Diego, says that Lester H. Graves, former IES president, retired, has now moved to live in Pasadena.

Coming and going

Besides smog another complication afflicts Los Angeles with the growth of air conditioning, used no doubt to alleviate the smog. The bureau of sanitation has issued a new policy to prevent discharge of cooling water into the sewerage system as of Oct. 8. The capacity of the sewerage system is overtaxed and alternate means of disposal of the water, also under permit from the bureau, must be used.

Test case

Worth watching for legal precedents will be a series of hearings by Federal Trade Commission against a number of ice cream companies from charges by the Refrigeration & Air Conditioning Contractors Assn., charging monopolistic practices in furnishing freezers and service free to customers. Hearings will be held in Phoenix, Los Angeles, San Francisco, Portland.

Code maker

Alvah R. Small, known to many in the West for his visits to inspectors' conventions, died Oct. 8. He had retired as vice-chairman of Underwriters' Laboratories with which he started in 1906 and became president in 1935. He was chiefly known as chairman of the electrical committee of NFPA, making the National Electrical Code.

Young blood

Arthur W. Hooper has been named successor of the late Charles Pyle as executive director of the National Association of Electrical Distributors. Hooper has been editor and staff member of Electrical Wholesaling magazine during the past eight years.

Show plans

An electric show in Seattle is a possibility as the Electric Club of Washington has appointed Eric H. Nelson, Shaffer & Nelson (representatives), as chairman of a committee to look into the matter. Present plans are for an apparatus and equipment show, although appliances may be included.

Honored

Bob Maxwell, who retired Oct. 1 as chief electrical inspector of San Jose, was tendered a big banquet Oct. 11 by an industry committee headed by Joe Santora Jr., chairman of the NECA chapter. He was presented a television set by the group.

Read and profit

New literature worth having: Westinghouse Lighting Handbook in a new edition has been readied by the Lamp Division, Westinghouse Electric Corp., to sell at $2.50 in a pocket-size format, 250 pages . . . Sunbeam Lighting Co., Los Angeles, prints up its "Sunbeam job of the month" in the form of a folder, called The Illuminator, which also contains other timely information . . ."Lighting for Color and Form" is a new book by Rollo Gillespie Williams, author of "The Technique of Stage Lighting," published by Pitman Publishing Corp. at $8.50 . . . Steber Mfg. Co. has packaged information regarding its lighting units applicable for Christmas and holiday lighting into two leaflets. It includes two new swivel-type portable units with complete shielding for PAR-38 and R-40 lamps . . . Very complete and helpful booklet on High-Voltage Lighting for Commercial Buildings by H. D. Kurt is available from General Electric Co. It is a supplement to Distribution Magazine, October 1954, and gives a contractor all needed information on 277-v lighting, wiring, costs, switching, etc. . . . The Carbon Section of NEMA has published a booklet called "Carbon Brushes for Electrical Machines," available from NEMA headquarters, 155 E. 44th St., New York 17 . . . Anaconda Wire & Cable Co. has brought out an up-to-the-minute catalog on magnet wire, the first major revision of its General Catalog No. C-79 since 1951.

The new look

More developments at FHA. Warning on the use of FHA in advertising was sent out by Norman P. Mason, commissioner, especially with the word "approved." . . . A builder's warranty is now required to insure a mortgage on a new home . . . The standards are being scrutinized and revised but so far they haven't got to the electric wiring, although that is on the agenda. On the advisory committee is Earl W. Smith, builder at El Cerrito, Calif. . . . Fee appraisers are used by the FHA to help catch up on the backlog of applications as they continue to pour in. This indicates a strong building boom for houses will continue . . . All gifts to employees are strictly banned and will be subject to disciplinary action . . . Orders went out not to do any more business with violators of the regulations.

More selective

A new distributor policy for its tape department has been announced by the Okonite Co. on all of its electrical tapes. It increases profit margins, gives protection against loss through price changes, obsolescence and inventory problems, and pledges the total elimination of direct sales. It also will include new unit packaging.

San Jose branch

Westinghouse Electric Supply will establish a new apparatus and supplies branch in a building to be constructed at Stockton and Julian Streets, San Jose, Earl E. Morton, San Francisco district manager, announced. Construction of the 10,000-sq-ft building has begun and possession is expected Jan. 1. Edward B. Taggard will be branch manager.

Anaconda's nonmetallic sheathed cable. Durall-T, thermoplastic-insulated and jacketed cable, is also approved as type UF for underground feeders under 1953 NECode specifications. This will permit its use as an underground feeder from house to garage or barn or outbuildings; use in farm buildings where acids, alkalis, fungus, etc., exist; and in industrial plants, mines and hothouses, etc. — **Inside and under**

Into a new Builders Exchange of Stockton building, just erected at 1521 W. Oak St., some distance from the downtown section but near a new industrial region, the San Joaquin County Chapter, NECA, the Employees Benefit Board and Manager E. H. Grogan moved Nov. 1. The Master Plumbers and Sheet Metal Contractors Assn. are also there. — **All move**

All manuals of labor units of the National Electrical Contractors Assn. are now to be registered and thus a record kept of them by NECA. Instead of an annual $5 service charge, the member who wants the manual deposits $25, which will be returned when the manual is returned, should he cease to be a member. — **Restricted**

National Electrical Code Handbook will cost $7.50 rather than $10 reported recently, the new edition of the book formerly prepared by the late Arthur L. Abbott has been revised by Charles L. Smith, electrical field engineer, NFPA. It is available from McGraw-Hill Book Co. — **Correct price**

First new Residential Wiring Handbook since 1946 is now being distributed by Edison Electric Institute. It was prepared by the industry committee on interior wiring design. The 32-page manual brings standards for home wiring in line with current and future use of electricity in the average home. It also carries the endorsement of the National Association of Home Builders and its recommended minimum service entrance of 100 amp. — **Needed revision**

Ilsco Corp. is the new name of what for 50 years was Ilsco Copper Tube & Products Inc. of Cincinnati, makers of lugs, connectors and neutral bars, etc. Recently announced was a new CAN neutral bar designed for compactness, better connections, elimination of crossovers in wiring, and in a larger wire range. — **New name**

Among some new things just announced: A liquid rubber coating that dries to live rubber, with a water base, hence nonflammable, called Rub-R-Ize, made by Rubber Magic Inc., Brooklyn, N. Y. For rustproofing, weatherproofing of wires, connections, shockproofing of tools, sound absorption and insulation against vibration and shock . . . Automatic Devices Co. of Western Springs, Ill., has a three-way Weather-Flo small home heating regulator that measures both outdoor and house temperatures . . . Arrow-Hart & Hegeman Electric Co. now offer standard magnetic starters and contactors through size three, with an enclosure, it has announced . . . Royal Electric Co. of Pawtucket has a new molded rubber cord set made with the L-shaped grounding blade for dryers and other appliances on 30-amp, 250-v circuits. . . . Cutler-Hammer announces a new motor control switch, No. 9101, single or double pole, that either fits a gem box or has a simple, wrap-around cover with straight-through wiring terminals, overload protection. — **New products**

Kay Lab now has a television intercom system for use between departments of a bank, office or plant. It has a 17-in. TV screen, one-half showing the caller, the other half the party called. By an adjustment the entire screen is available for viewing signatures, blueprints, documents, articles, etc. It can be used for monitoring or for receiving outside programs. Made by Armstrong-Schramm Co., San Diego. — **See and hear**

A new traffic sign that can blank out part of the lettering, such as during peak hours, is being tried out in Portland. It is manufactured by Elwood Wiles Co. of that city, which makes cold cathode traffic signs. This is an adaptation of such a sign in which a shaded-pole electric motor of 12-w holds down a spring roller shade on which the first message is printed. Time clock control releases the motor tension and the shade moves up to reveal the part-time message. With the cold cathode, flashing is possible to increase attention. — **Quick change**

A sales booster pamphlet defining types and markets for electrical signaling equipment has been prepared by the wiring devices, fuses and signaling equipment committee of the National Association of Electrical Distributors, to aid salesmen develop more business in this market. — **Stimulator**

Push buttons instead of faucets for basin

Timer dial to turn the shower on and off

Buttons and depth dial and floor switch

News—Plumbing Electrically Controlled

Long enough has the electrical industry taken the jab that the plumber outsells it. Now a Spokane man, Kenneth Bartholoman, has electrified plumbing, controlling it all electrically, "the first really new thing in plumbing in 50 years," he claims. And, like "man bites dog," this is news in electrical convenience that can be sold too.

As an installer and salesman for outdoor sprinkling systems, Bartholoman first applied an electric time clock to the control of solenoid-operated valves for sprinkling lawns automatically. Then when he revamped his home plumbing he carried the idea into that, using valves adapted from those used in automatic washers. Now he packages the valves and controls in a unit he calls the Bart-o-matic system to be sold and installed to better class homes willing to buy this added convenience. It will cost from 10 to 15% more than conventional plumbing to install but operating cost will be minor and it can save on water consumption. The unit includes thermostats that regulate the water temperature there instead of at the tap.

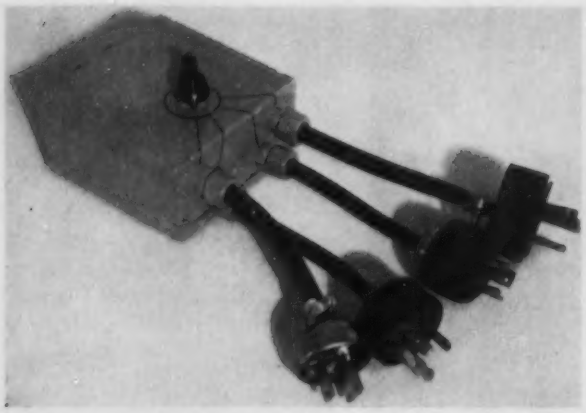
There are no faucet handles. At the sink there is a wall push-button panel. With a dial the depth of water can be set. Push buttons start the water. At the floor there is another, a three-position foot switch to turn on cold, warm or hot water for rinsing, leaving the hands free to handle the dishes. In the bathroom a similar panel over the basin has buttons for hot and cold water and the drain for both the basin and the bath tub and a depth dial to set the water depth desired in the tub. It turns off automatically when it reaches that level, preventing overflow should one leave the room and forget it. The shower stall has a dial to turn the shower on for a specified number of minutes, then it turns off.

Bartholoman with lawn sprinkling timer control demonstration kit he started with

Bath water can be turned on by a circuit to a bedside clock radio if desired. So can the shower, or the lawn sprinkling system. Thus the sprinkling can be done when the pressure is best, even in the night if desired, without getting out of bed to control it. Another feature is that, if there is rain, the sprinkler holds off automatically. A small bucket with a float is attached to the eaves gutter. If it rains the bucket fills, the float rises and trips a relay to shut off the system. When rain stops a needle valve releases water until the float drops and the switch trips on again. Many combinations of control can be worked.

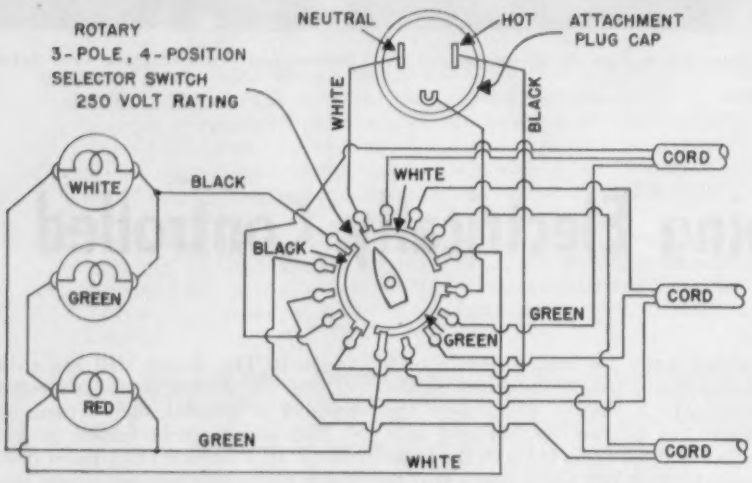
Even the flushing of the toilet is done by pushing a button.

After all the automatic washer controls the cycles of washing and of filling and emptying the tub by electrically controlled valves, why not apply the same devices to the other water uses in the household, Bartoloman reasoned. By arranging the valves, solenoids and thermostats in a single unit, located in the basement, all servicing can be done at that location and only pipes run to the different faucets. This can be one more service electricity can do better in an all-electric home.

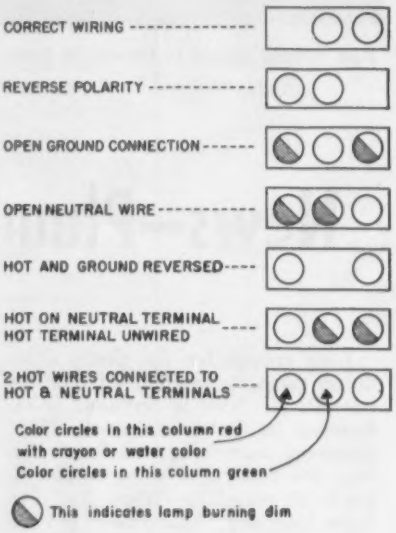


Device to check circuit polarity of four common receptacle types and below it Fig. 1, the connection diagram for wiring in the box

On the back, as shown above, the code of lights (Fig. 2), which give the user the information about the circuit being tested



Schematic of Connections


CORRECT WIRING
REVERSE POLARITY
OPEN GROUND CONNECTION
OPEN NEUTRAL WIRE
HOT AND GROUND REVERSED
HOT ON NEUTRAL TERMINAL
HOT TERMINAL UNWIRED
2 HOT WIRES CONNECTED TO
HOT & NEUTRAL TERMINALS
Color circles in this column red
with crayon or water color
Color circles in this column green
This indicates lamp burning dim

Circuit Ground Tester for Portables

Thomas R. Hughes

Electrical Safety Engineer, California
State Department of Industrial Safety

For making a quick check at the wall outlet receptacles, to see that connections are correct and that the clip engaging the grounding prong is adequately grounded, a device is needed. Most large factories use a variety of portable electric hand tools and procedures for checking their connections at tool cribs have long been established.

Pictured here is a device designed for checking at the four most commonly used makes of 115-v, three-pronged, single-phase plug receptacles. It is a refinement of one devised by the safety department of E. I. Du Pont de Nemours & Co. and described in detail sheet No. 123 of the National Safety Council. However, that is intended for use in one plant where all receptacles are of one type and it is equipped with one plug cap. If there happened to be two types of receptacles in use the attached plug can be used with an adapter. Ours is intended for an electrician or inspector who goes into several plants that use different makes of plug receptacles, who does not want to have his pockets loaded with adapters.

This outfit requires a larger box, a standard aluminum 2 x 4 x 4 chassis box or a 1½ x 3½ x 4 if available. The three indicating lights, colored red, green and white, are intermediate base type such as used in pilot lights, night lights, etc. The three sockets, with a three-opening strap for mounting on a standard outlet box, are made by several device manufacturers and are equipped with nickle-plated shields to cover the lamps. Lamps can be covered with a dip dye.

A rotary-type, three-pole, four-position selector switch is used to connect the required plug to the indicator lamp socket terminals and leave the exposed prongs of the other plugs dead. This selector switch with its pointer operating handle and the aluminum chassis box can be obtained at any radio parts supply house.

Fig. 1 shows the schematic of connections and the relative arrangement of components for convenience of wiring. The selector switch may be obtained with all contacts mounted on one deck, as diagrammed in Fig. 1; or it may come with groups of contacts mounted separately on two or three decks. A four-position type may not be in stock but six- or seven-position types may be on hand with a movable stop that can be set for use of only four positions.

Lamp sockets, selector switch and cord entrance connectors must be arranged so they can be mounted in the flat side and ends of the same box half or extra wire will be needed and loops may get tangled in selector switch moving parts. Lamps mounted in one end as shown should be wired before final mounting, leaving connecting wires just long enough to reach proper switch lugs. Choose the position for the switch as near the lamp sockets as possible so that plenty of room will be left for the cord connections. Cords here are about 12 in. long. Proper rotation must be observed in connecting wires from each cord. Set the selector at the first counter-clockwise position and connect all three wires of the left-hand cord to the respective segments. Then rotate to the next position and connect the next cord, etc. All wires should be soldered to the proper lugs before mounting switch in the box and locknutting it in position to prevent it from turning.

Each type of plug has its neutral terminal made of a light colored metal and the hot terminal of raw copper or brass for identification. Care must be used to see that the white wires of all the cords are connected to the light metal terminals if the indicator lights are to work right.

On the other hand, if the receptacles are used only for motor-driven hand tools or lamp cords it may be that the polarity of connecting the hot and neutral wires is of no consequence in the plant being checked. In this case, either of the first two conditions indicated in Fig. 2 is acceptable. If some types of equipment (such as electronic test equipment) in that plant require polarization, this tester will indicate correct polarization.

If an inspector wanders into a strange plant where he is not sure what voltage is being fed to a certain type of plug receptacle, he may want to use a voltage tester first to make sure he is not going to burn out his lamps with higher voltage.

Fig. 2 shows the typed notations used on the label mounted on one side of the box under a sheet of clear plastic material.

Sprinkler irrigation from ditch water can be done more economically electrically with

Portable Motor-Running Plants

George E. Giles Jr.

Farm Power Advisor, Sacramento Municipal Utility District

Farm wiring distribution for the electrical contractor and new load for the utility is coming from electric "rain making," or sprinkler irrigation, in the Sacramento Valley, which until recently depended upon ditch irrigation only. This trend toward sprinkling in many cases has brought in gasoline- or diesel-powered pumps because of their portability.

Recently a few progressive farmers who sprinkle-irrigate their land have become interested in a portable electric pump application. Here was an opportunity to demonstrate the increased benefits of an electric drive.

An installation in the delta area was planned and it was decided that a 60-hp pump would be needed. We convinced the ranch owner that, as the rates were applied, the most advantageous way for him to receive power would be through one meter, with him running his own secondary lines where needed.

Two power take-off points were located a half mile apart and power was metered midway between. This one rain machine could effectively take care of 640 acres in row crops and alfalfa and give the electric drive the stimulus needed.

The district's advisory services for allowable voltage drops, wire sizes and types of pumping plants are available to ranchers. Farmers in the delta area saw that portability was not the great obstacle they thought it was and that their own secondary line construction could be done by contractors economically. Line construction costs vary depending upon terrain and the number of stations desired, but bids from competent contractors should show ranchers that the total cost of an electrical system would compare very favorably with a diesel or gasoline engine drive of equal output, besides deriving the added benefits of increased efficiency and low operating and maintenance costs.

A horizontal centrifugal pump is used for rain machine work. Water is picked up from a high line ditch at lifts of about 4 to 8 ft and boosted to a 65 lb discharge pressure. The one pictured above is a 30-hp unit that tested out at 70% efficiency. It irrigates 65 acres of pears from three power take-off stations on 2,200 ft of rancher-owned secondary. A small electric gear pump is used for priming and a dry transformer for lights. Note the mechanical interlock device on the switch to prevent connecting or disconnecting with the switch on.

ELECTRICAL WEST

"Eager Minds" Deserves an Oscar

IF the electrical industry can devise some sort of an Oscar such as the motion picture people prize, then it should be given to those responsible for the Light's Diamond Jubilee film, *Eager Minds*. Here is a picture that should be shown to everyone in the industry from top to bottom just to restore his or her confidence in the future of this great business. If the picture did nothing more than this, its value to the industry would be great. However, this is but an incidental benefit. Primary purpose of *Eager Minds* is to instill in American youth the fact that there are still unlimited horizons and unconquered frontiers in science and industry—especially in the electrical industry. This it does superbly and convincingly. Here's one orchid to a splendid job, conceived with vision and understanding and executed with subtlety and excellence.

Partnership As It Should Be

HEALTHY and sound are words to describe the new look the present administration has given to the Rural Electrification Administration. Instead of letting REA adopt an attitude of belligerence and socialistic competition with power companies, it seems really to be trying to foster a real partnership among all those who will help to bring about greater and more productive use of electricity on the farm and in the farm home. Among the pioneers in that laudable aim, of course, have been the business-managed, stockholder-owned utilities, especially those of the West. The REA cooperatives have no monopoly on this worthwhile project, as history will bear out.

Five recent area conferences of the inter-industry farm electric utilization council have brought together representatives of electric cooperatives, power companies, manufacturers of farm equipment and appliances, wiring contractors, farm and educational groups and the extension service. At each plans are worked out for good practical joint activity at the state level, where it makes sense. Conscientious managers of electric co-ops seem to welcome this new attitude of friendly partnership as much as do the power company representatives—which is as it should be in America.

High Time to Rewire

NEVER in the 75-year history of the electrical industry has there been so much advertising, so many articles in popular magazines and newspapers on the need for more wiring. It is as though a dam had broken at last to flood the nation with advice to get a contractor and do something about it. And although many are heeding, to do so is still so beset by difficulties to the homeowner that only the desperate go through with it.

In view of this aroused public interest at last, isn't it high time that the national associations of manufacturers, contractors, distributors and utilities get together to develop a simple financing and procedure package that can be employed at the local level by the leagues and bureaus to lift this surge of interest into real action? It is an all-industry job that needs to be done. Why delay another day to get at it? Future sales of almost everything in this business depend upon getting more wiring installed.

Research Is an Untapped Resource

ONE of the great and only partially tapped resources available to business and industry is the research facilities and trained personnel of the Western colleges and universities. The degree to which they are utilized varies from industry to industry and the light and power business regrettably is far down on the list. This certainly is not because there are no areas in which research is needed. Lest it might stem from a lack of knowledge of what universities can do, we quote from a thrilling and informative booklet published by the University of California entitled "Free Enterprise and University Research":

"Over the years as industry has come to realize the relation of universities to tech-

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nological knowledge and training, corporations have begun to see that expenditures on behalf of the long-term health of the American economy rank in importance with payments to stockholders. While management's prime responsibility is to investors, research by universities, whether applied or basic, has been increasingly described as a legitimate area for investment of venture capital. The difference between research dedicated to the application of known fundamental facts and that dedicated to discovering new fundamentals is in final analysis the difference between short-term and long-term profits.

"Corporations are concerned, over the long run, not alone with knowledge which may be applied to products and their manufacture, but also with the training, recruiting and holding of personnel; with the attitude of the community toward corporations; with the welfare of the market they serve; and, more broadly, with any question which relates to the national or world environment in which they are expecting to do business. In all of these matters, universities may render appropriate assistance, and do so with such economies as can be expected only from a specialized, going concern."

We repeat: Here is a latent resource. It is one that the light and power industry can and should use.

CBA Is Like a Nine-Lived Cat

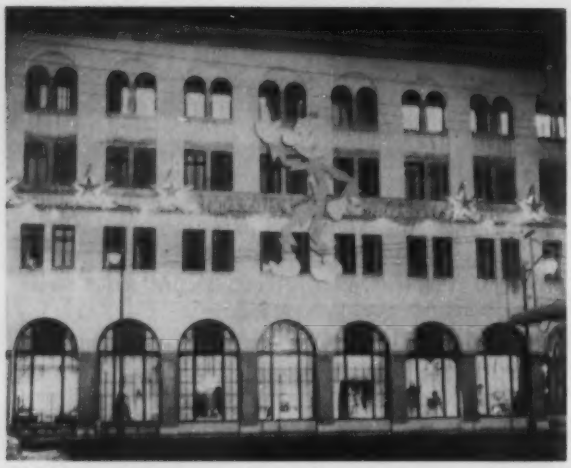
THE regional power authority idea for the Columbia River Basin is harder to kill than the proverbial nine-lived cat. Despite the fact that the majority of the people of the Pacific Northwest show no interest in it, that the individual states in the area have protested it vigorously and that three or four Congresses have pigeonholed it, the proposal continues to pop up in new guise.

Now making the rounds is a suggested bill to create a Columbia River Development Corporation modeled after the St. Lawrence Seaway legislation. Purporting to be a "home-rule agency," the corporation would, in fact, be a creature of the federal government. It would be administered by a board of five directors appointed by the President and responsible to him. Financing would be done by revenue bonds sold during the first five years to the federal treasury and guaranteed by the federal government.

Plans of the bill's proponents are to have it ready for introduction at the next session of Congress. Since it is in complete conflict with the partnership power concept, it should, like its predecessors, die aborning. But like the cat, it will probably spring to life again.

You Can Say That Again

IT is as profoundly true today as it was over a thousand years ago when it was first written: Man doth not live by bread alone. It's true that you can buy a man's time. It's true that you can buy a man's physical presence on the assembly line or behind a desk. But you can't buy the devotion of a man's heart for his job. You can't buy a man's loyalty to the company for which he works. No pay check will ever buy these intangibles of the human spirit. To exist, they must first be earned . . . A business corporation is like an army. When the individual soldier has a sense of pride in his organization, his morale is high . . . An army fights on its pride. It has to believe in something. It has to have confidence in, and respect for, its officers. Like an army, this sense of pride in a company, this feeling of confidence in and respect for a company's management, has to begin at the top and seep down. It starts with the company president. On his actions, on the business standards and ethics which he imposes on himself, rests the solid foundation for this sense of pride. Far more convincing than all of the house organs, bulletins and employee magazines and factory communications with which we inundate our employees, is the example set by the company officers and executive themselves.—Elisha Gray II, president, Whirlpool Corporation.



Windows of Hawaiian Electric Co. were turned over to the churches of Honolulu to depict scenes of the birth of Christ

Hawaii Brings Back Christianity Theme

"Without Christ there would be no Christmas, a fact some may be losing sight of, for Santa Claus and the Christmas tree have been emphasized in recent years," editorialized the *Honolulu Advertiser* in commending the churches of Honolulu and Hawaiian Electric Co. for the decorations in the latter's office building windows prior to Christmas last year.

"One of the most gratifying manifestations of the real Christmas spirit is to be seen in the windows of the Hawaiian Electric building, where at least 200 persons, working for seven church groups, toiled to unfold the Christmas story in seven scenes. Then, working busily, they set up an eighth scene showing a typical Christmas in a Christian home," this newspaper said.

The idea for this was brought with him, from a similar one he had initiated two years before at Hilo, by Francis H. Williams. At that time he was commercial manager of Hilo Electric Light Co. Pictures of that display appeared in ELECTRICAL WEST at the time. Now he is sales counsellor in the promotional department of Hawaiian Electric Co. and works with dealers and distributors in the promotional campaigns on appliances sponsored by the Pacific Coast Electrical Assn.—Hawaii Section. He approached the church groups and found them enthusiastic.

The company contributed funds for the purchase of materials and lighted the displays. The techniques were entirely the ideas of the individual groups. However the scenes were in a sequence that started with the visitation, then the annunciation, the journey, the arrival at the inn, the wise men and the star, the shepherds in the field and the manger scene. Churches participating included: Episcopal, Methodist, Congregational, Baptist, Catholic, Lutheran and Disciples of Christ. The Christian home exhibit (see cover) was placed inside the building just off the arcade.

The manger scene was pictured in one window by the Baptists

Annunciation—by Congregational churches

The Journey—by the Episcopal churches

Shepherds in the field—by Lutheran Church

Tiffin Dining Room, first place winner in the commercial division

The A. S. Bosch residence, one of the many prize winners last year

Denver's Tradition of Christmas Light

Each holiday season for years Denver has been known as the outstanding Christmas lighted city of the nation, a tradition it started and that has been copied all over the world. Not only is its colonnaded civic center group of buildings festooned with lights, a picture familiar because of the widespread publishing of it throughout the years. But its citizens each year contest among themselves to decorate their homes and buildings. The pictures here are of some of last year's winners and, according to Ralph Hubbard, manager, Rocky Mountain Electrical League, it was the greatest contest so far.

Early in November a representative committee, including the Junior Chamber of Commerce, Denver *Post*, Rocky Mountain Chapter of National Electrical Contractors Assn. and Public Service Co. of Colorado and Colorado Central Power Co., gets started. The Junior Chamber handles the prejudging, selecting about 80 of the best displays to be judged for final prize winners. The final judges are three men entirely independent of the electrical industry.

The contest is divided into four divisions—residential adults, children under 16, commercial buildings and churches or schools. Electrical appliances are awarded as prizes to the first 25 in the adult group and first four in the children's group. A trophy is awarded the commercial winner and a check for $25 is given in the church or school group. In addition all are given a certificate, and an honorable mention goes to all not winning a prize. The league purchases and pays for a majority of prizes but the newspaper contributes $100 toward these, plus a tremendous publicity which it begins about Thanksgiving. With a daily story it runs a coupon for entry in the contest.

Judging was completed the week of Dec. 14 and winners announced on Sunday Dec. 20. Awards were made at a group meeting Dec. 29. Winners were listed geographically so that people interested in seeing them could drive from one to the other.

Decoration of the civic center has been a tradition carried on by John Malipede, city electrician, for many years. One year an art group tried to "modernize" it but public protest brought back Malipede to do it in the old-fashioned way.

Walter A. Kist residence, third place winner for the city. Above is W. L. Prouty home, second place, and E. R. Caldwell, sixth place

Distributors Take Stock of Their Assets, Liabilities and Future

Al Byers honors R. A. Balzari; W. B. Imholt and L. E. Barrett, two presidents, at table

What goes on at a wholesalers' convention? A lot more than golf these days of problems in distribution. Squeezed between the pressures of the manufacturers and the passed-on chiseling of their customers' customers, the middlemen of distribution have many things to think about, learn about and plan to meet. The Pacific Zone annual convention of the National Association of Electrical Distributors, at Hotel Mark Hopkins, San Francisco, Oct. 3-6, drew a record registration of 491 (an all-time high) for just such a look at things confronting them as well as a preview of opportunities open for more business in the future.

The scope of subjects covered everything from Edison and Light's Diamond Jubilee, future lighting markets and wiring markets, contractor and manufacturer relations, legal aspects of selling below cost, discounting, credit, the economic outlook and finally to human relations and salesmanship.

Lamps and Light

Appropriate to the year, the general session started with a tribute to Thomas A. Edison by a man who knew him personally and who now has one of the greatest collections of Edison's original material in the world. Ward Harris, Ediphone distributor for northern California, painted a human word-picture of Edison as an inventor, as a good business executive and as a friendly personality. He also predicted inventions in the future that would bring still greater opportunities to the electrical industry.

Lamp sales opportunities in the 10 years ahead were projected by Frank Falge, manager, Pacific sales district, G-E Lamp Division, from the base established during the past 75 years. He forecast a total of 10,000,000 fluorescent lamps per year by 1964 and a growth of lighting fixture business from $447,000,000 in 1952 to nearly $1,350,000,000 in 1964. Over 60% of the industry's lamp sales are in types that were not even available in 1938 and with continued research and development manufacturers will broaden the lighting market. In the immediate future is the volume expected from higher wattage lamps in smaller envelopes and the new color-corrected mercury vapor sources. If the stores, offices and homes of the present were brought up even to minimum lighting standards, he said, it would create a $19,000,000,000 market. The average home has only a third of what it should have in illumination.

The distributor's stake in the National Lighting Bureau program followed in the same vein later on the program. It was given by J. Horton Fall III, vice-president and general sales manager of Benjamin Electric Mfg. Co. Fall described the need for a national lighting program on commercial and industrial lighting, following war years of easy selling and high turnover in sales personnel with diversion of trained men to other work.

He described the test research made in Minneapolis last year in which it was discovered that 85% of the small stores, offices, schools and industrials had less than the minimum recommended lighting levels of the Illuminating Engineering Society. To contact this multitude of small accounts, the contractor is the logical man but he needs help in technical training, sales training and enthusiastic backing of the distributor. The certified lighting program is designed to provide (1) a certificate and decal to identify a good job with check lists and sales reasons available; (2) sales training by a local lighting bureau; (3) technical training program in simple watts-per-square-foot language; and (4) a planned promotional program. He announced that the San Diego Bureau of Home Appliances, Contractors Division, will use the program.

Weary Wiring

That a public at last awakened to its serious need for more adequate wiring should be followed with definite packaged plans to convert this interest into actual installation and sales was stressed by both Lester E. Barrett of St. Louis, NAED president, in a short report on the national adequate wiring program and by William A. Cyr, associate editor, ELECTRICAL WEST, who described the Northern California Electrical Bureau's experience with its television spot advertising program early in the year.

Barrett told of both consumer and trade publication publicity in great quantity lately and of the National Association of Home Builders acceptance of the voluntary recommended standard of 100-amp service entrance equipment for tract homes as evidence of need for such a follow-up.

He told of the success such utility programs as the Cincinnati plan and similar ones in Phoenix, Portland and Spokane to package the necessary rewiring under an easy financing plan.

A public aroused to its need, yet faced with high costs of labor, plus the do-it-yourself trend, Cyr warned, may divert this rewiring business so needed in 90% of existing homes to other

Irving Bean takes over from "Duke" Imholt

channels than the distributor and contractor. He described the phenomenal response from the series of one-minute spot programs on TV stations in San Francisco and Fresno and the lack of good financing program to follow up on this interest as indicative of the situation throughout the West. He ended with a plea to make it easy for the public to buy, which would likewise keep this business in the trade channels on a noncompetitive, selling basis.

Price Cutting Frustration

Any hope that the Unfair Practices Act of any of the Western states could be used to police price cutting was dampened considerably by Wallace Howland, assistant attorney-general of the State of California. He described in detail the provisions of the act dealing with selling below cost and how cost is determined, overhead cost being included. However, intent to injure a competitor must be proved. The courts have ruled that there are many possible valid reasons for selling below cost, which are not malicious—such as closeouts, end-of-season stock, perishable goods, or even to meet the legal price of a competitor.

Discount houses will be beaten by the laws of economics and not by man-made or government-made regulations, Bruce A. Wilson, manager of the appliance division, Thomson-Diggs Co., told the convention. He left these questions to answer themselves:

"What is the value of a brand name? Can the quality of a product be maintained if the profits are removed? How long will it be before the manufacturer must discount his price to get the discount house to buy it? What happens when discount house cuts discount house? With sales concentrated in a few outlets, how can the manufacturer continue national advertising, which geographically covers the entire nation? What happens when the dealer and distributor quit stressing the brand and hunt for the profitable item of the manufacturer who has decided to protect his price and quality? How long can a program exist where the customer no longer knows what is a fair price?"

Because discount houses cannot maintain the necessary volume alone, since they never merchandise, and since such brands will then only be sold through outlets that do not service or guarantee and the brand name will suffer, the discount houses will soon drop it. This will hurt manufacturers. Discount house competition among themselves will cause the manufacturer to lose, he said, because as the brand loses prestige the discounter will drop it.

A crusade to rebuild confidence in the industry was the plea in a strong and straight-forward address by Carl S. Menger, vice-president and sales manager, Triangle Conduit & Cable Co. Inc. He maintained that price cutting is a result of loss of confidence and respect for the business of distribution. It also accounts for the other evils besetting the industry.

Confidence must be rebuilt first in the business itself. In asking "Why Are We In Business?" men will examine their goals and make decisions and programs on the basis of building something that will last. Confidence must be rebuilt in wholesale distribution as a vital link in the marketing chain. This must be done by performing the functions expected of a distributor. The manufacturer must also express confidence in the wholesale distributor. Third place in which he advised a return of confidence was in selling and in the training of salesmen to sell, and of purchasing agents to respect distributor salesmen, because of brand reputation, product quality and distributor service. A crusade, he concluded, must begin with the leaders and he laid down the challenge to this group to assume that leadership.

Interdependence

The electrical contractors' views were brought to the distributors' convention by Edgar L. Buttner, Scott-Buttner Electric Co., Oakland, and District 6 vice-president of National Electrical Contractors Assn. After outlining the ways NECA is trying to build better businessmen of its members, he discussed several mutual problems of contractor and distributor upon which he asked sympathetic support.

Too many of the fringe contractors, he said, are being kept in business, although they are broke, by too liberal extension of credit from distributors. This is "digging a grave for the distributor as well as for the solid contractor," he maintained. He urged instead encouragement and help for the contractor who puts some capital of his own in the business and who is making a determined effort to promote the business.

He urged the return to a firm price in the quantity purchased plus a fair cash discount on the 10th and net at 30 days. Such a policy would also discourage the small industrial who buys in small quantities from wholesalers and the contractor could return as the supplier of this business.

He also asked that distributors stop doing estimating for contractors. That, he said, was the contractor's own responsibility. Instead, they should put their efforts in determining the materials needed to meet the job specifications and, when requested, quote unit prices and not a lump sum based on a list taken off by the salesman. This brought applause from the distributors.

Probably the strongest address in the convention was that given by A. H. Gudie, president of Biddle Trade Bureau, Los Angeles, and of its affiliate, Trade Service Publications Inc., of Chicago, as he laid bare the interdependence and yet causes of difficulty between the distributor and manufacturer. He minced no words in laying down the truth about failures of distributors to meet their function in the industry properly. This, he maintained, has brought about the condition of manufacturers setting up local warehouse stocks and even calling on the wholesaler's contractor and industrial customer and quoting prices, often below the distributor's cost.

Like the previous talk of Gudie to the wholesalers' salesmen in San Francisco (see EWEST, May p 63), ELECTRICAL WEST will publish a digest of this talk in a later issue.

Good Business Prospects

Two executives from the Bank of America, Harold Furst, economist, and Lloyd Mazzera, vice-president, brought the banker's viewpoints to the group as well as prognostication of the business outlook for the next six or nine months.

Furst summed up, after discussing each item in some detail, the prospect for the Western states about as follows:

Government expenditures in the West will continue to be a larger proportion of the total than in the East.

Population increase will continue upward. Employment will keep about even. There may be an increase in unemployment due to the influx of people not absorbed in new jobs. In construction, private work will be down a little and public works will increase, notably in schools. Agricultural income will continue downward in proportion to the rest of the nation, although the total dollar volume will be about the same. General retail marketing conditions will be about the same. Number of business failures will probably rise to a new record. All of this, he said, should cause businessmen to re-examine the efficiency and service operations of their business.

The way to reduce business failures, Mazzera told the group, was to work with their contractor and dealer customers, to upgrade their business practices. Then he detailed some of the "how to do it" of business, including planning, merchandising, promotion, selling, personnel, operations, credit, financial management.

He defined selling as "the sale of merchandise which won't come back, from customers who will come back."

In a rousing, inspirational talk, Dr. Royal L. Garff, professor of speech and marketing, University of Utah, closed the convention on the general subject "How Are Your Human Relations?"

New Officers

At the opening day's executive session, the following officers were elected for the new year term and the next convention decided to be held at Victoria, B. C., if the Empress Hotel is available. For chairman to succeed W. B. Imholt of San Francisco, will be Irving P. Bean, Bean Electric Co., Seattle; on the national board of governors, Imholt, Electric Corp., San Francisco, Clyde Soden, Soden Electric Co., Riverside, succeeds Sam Scott of Graybar, and Phil Tillman, Tillman-Booth Co., Eugene, Ore., succeeds Hugh Hanna, Stubbs Electric Co., Portland. William Jewel was re-elected to continue as secretary-manager.

Honored at the chairman's dinner, on Tuesday night, were some of the retired old-timers of the association including Ernest Brazier, formerly G-E Supply, Denver and Salt Lake; Dave Harris, formerly G-E Supply, San Francisco; and Phil Carson, formerly Graybar, San Francisco; Jacob Kahn, formerly G-E Supply, Salt Lake City; Al Nicoll, formerly Graybar, San Francisco and New York; Dave Salsbury, formerly Westinghouse Electric Supply, San Francisco, Seattle, Salt Lake City and New York; and Axel Kahn, formerly G-E Supply, Chicago, were presented honorary life memberships by President L. E. Barrett. R. A. Balzeri, former secretary-manager, who retired last year, was likewise honored by Al Byers, NAED executive secretary.

Edison's friend, Ward Harris, lamp, phonograph; and today's G-E Lampman Falge

Winners of the golf trophy were John B. Harvey, Wesco, Fresno, the copper cup; T. J. Ludlow of Keiler White Co., Seattle, the Irving Colwell trophy; and the Hole-in-One contest, A. H. Howard, Tri-State Supply Corp., Los Angeles; Ruth Stewart, wife of J. W. Stewart, Essex Wire Corp., Los Angeles, won the women's trophy of Carl Wille, Modesto.

Lamps Blaze Trail

With 365% of quota Panguitch Division, Telluride Power Co., topped all other divisions in the Diamond Jubilee Gift Bulb Campaign, Sept. 15 to Oct. 15, that closed with a 231% of quota for the system. Quotas were set at 75 w per residence meter or one lamb bulb bag to each 10 houses in the service area. The employees of the company sold 172 w per meter or better than one bag to each fifth house or apartment, according to W. O. Cluff, sales manager.

"As you know, most bulb campaigns are sponsored by the utility with the cooperation of dealers. After a visit with many lamp retailers we decided to deviate from the usual campaign plan and put on one without the dealers help for several reasons.

"1. We found the great majority of lamps were being sold by supermarkets, drug stores and grocery stores.

"2. These stores would not or could not take the time to keep accurate records of lamps sold, in sizes, or to make weekly reports.

"3. More empty sockets exist in small rural communities than in the larger towns where the stores operate.

"4. None of the stores contacted objected in any way to our selling direct.

"So, realizing that house-to-house selling, especially in the smaller towns, was the only way we could fill the empty sockets we decided to do the job ourselves.

"A carton was made up consisting of four 60-w, four 100-w and one 150-w lamp that was to be given free. The nine lamps sold for $1.44. A commission of 15c per bag was paid to the employee or any one of his family who made the sale. Free delivery was made by the company. All employees were asked to cooperate as well as part-time workers. These included collecting stations in small towns, meter readers and part-time station operators. One boy, a 12-year-old son of an employee, sold 86 bags the last week of the campaign.

"Our cashiers at each office reminded everyone as they paid bills of the special gift offer. During slack periods they phoned people who had not been in the office. Four radio spots daily covered the entire area. Six weekly newspapers carried ads."

Contrast and Course

A "then and now" theme as a tie-in with the 75th anniversary of the electric light will be given the Electrical Home and Appliance Show of the Bureau of Home Appliances of San Diego County opening Nov. 26 through Dec. 1. Originals and authentic reproductions of many appliances and pieces of equipment from the famous Rushford Collection will be brought from Salem, Mass., to spotlight the show. Exhibitors are also urged to include as many pioneer appliances for contrast with their modern ones as possible.

The bureau has just concluded six electric housewares clinics with a fine attendance of dealer salespeople. Eleven manufacturers, whose products were included, presented sales and informational features to help them sell housewares more effectively during the Christmas season. The participants, Dormeyer, General Electric, Knapp-Monarch, Nesco-Dulane, Oster, Proctor, Sunbeam, Toastmaster, Universal, Westclox and Westinghouse, also gave the appliances used in demonstration as door prizes. The committee, headed by Bert Sutton, staged these clinics with Dan Turner, director of sales training, and Assistant Carleton Barker, both of San Diego Gas & Electric Co., conducting the course.

Promotional plans for the future include an electric range campaign in the county area.

ELECTRICAL WEST

Sales Guide

News Letter

November 1954

FOR THE ELECTRICAL MERCHANT OF THE WEST

Was the Jubilee contest a success in northern California? It certainly was! Entries totaled more than 95,000 and they were still coming in from the smaller towns. There were more than 10,000 from the San Joaquin Division alone. Dealers said it was the finest sales boost the Northern California Electric Bureau and PG and E had ever done and its effects will be felt in sales the rest of the year. After the drawing the coupons will be returned to dealers as prospect leads.

"Acres of Diamonds"

Most surprising was the predominance of refrigerators, then freezers, in the appliance named by the entries as the one wanted. Does this mean that the appliance dealers have not appreciated a public attitude that a refrigerator, like a car, should be turned in for a new one every so often? A complete analysis of entry coupons is being made to learn as much market information as they may contain for the benefit of future promotions and sales, Jack Ross, manager, domestic sales, says.

Unexpected favorite

Something else big to tie to for Christmas sales is the national promotion, Operation Snowflake, U. S. Steel's big assist to the major appliance trade starting with Nov. 27 issue of Satevepost, TV programs Nov. 16, 23 and 30. "Make It a White Christmas---Give Her a Major Appliance" is the slogan. Display kits are available to all dealers.

White Christmas

Electric Housewares should really be hot this Christmas as NEMA's national promotion and ads get under way and power company ads boom out the same theme in every community in the land. . . Best prepared to take advantage of it is a place like San Diego where the Bureau of Home Appliances has run another selling course with housewares makers' help to coach salespeople on how to demonstrate and sell effectively.

Jumping!

San Diego's bigger than ever 17th Annual Electrical & Home Appliance Show will be opened in a blaze of glory in Balboa Park in a public ceremony with an A Capella choir, Mr. Santa Claus emerging from a huge fireplace, Miss San Diego as hostess and first lighting of Christmas Tree Lane through the park, Nov. 26. The show runs through Dec. 1, will occupy four exhibit halls, be seen by over 175,000 for free.

Biggest show

Sues, Young & Brown's square-jawed Charlie Culbert may be sticking his neck out for the whole industry but that distributor really means business in its cleanup of policies that lead to discount evils, even at the cost of some big volume. It has refranchised all dealers, handles only fair trade fighting lines, and is determined to see that strong dealers who play square do a good and a profitable business.

Real guts

Twinkle aplenty

Wraps are off of all Christmas decorative lighting this year as there seems to be plenty of power everywhere. Although late to start local contests now from such fine guides as that available from General Electric Lamp Division, there's still lots of business to get in the sale of decorative cord sets and devices. . . Royal Electric has a large group of decorative devices and a new Twinkling set of 20 flashing low voltage lamps with transformer listing at $11.50. . . Noma Lites has a full line and a new illuminated Nativity scene in 9-color translucent plastic. It also has pairs of plastic outdoor lamp posts.

Safe or sorry?

The gas industry doesn't realize what a sales talk item it is giving the electric appliance people by its drive to change ordinances to permit gas ranges installed without outside flues in kitchens. Trying to match the electric range's versatility in kitchen placement at the sacrifice of safety is apt to bounce, if not prove tragic.

"Taint so"

Penny Owsley Music Co. in Los Angeles corrects us in a report that it had dropped radio and TV. "We not only continue to aggressively merchandise and sell TV and radio but we also have one of the most complete high fidelity departments on the West Coast," says Emory Penny.

Dogfight

On the discount battle front the war goes on but there are signs that discounters business volume has fallen badly, breaking some. Rivalry among the price cutters is killing them off in price duels. FTC told the National Assn. of Discount Merchants it would not force wholesalers to sell to them. In Los Angeles where G-E, Toastmaster, Sunbeam and Westinghouse are sniping them down with injunctions, one discounter resigned from the association, saying he was going straight. A prominent dealer who went discount recently also said it would not work, for his customers expected service of him. . . And the U. S. Supreme Court refused four appeals challenging fair trade laws. . . Perfection Stove Co. reduced its electric range prices from $50 to $100 to enable its dealers to meet discount prices and still retain their margin.

Delayed action

If the weather in the West has been so good customers aren't buying dryers, cheer up. Any promotional effort put forth now will bring them rushing in for dryers as soon as the rains come. . . Most every power company is promoting them. Utah Power & Light has a drive, so have Washington Water Power, PG and E, Los Angeles Dept. of Water & Power, and others. Dryer sales, on the dealer reports, are up everywhere.

Wire up

It is official now--the Washington Water Power wiring finance plan to use for wiring to ranges, water heaters, dryers and air conditioners. Customers pay for the installation wiring with their electric bill.

Come-ins

Hotpoint has two ingenious door opener gimmicks for its dealers--a children's "First Cook Book" written by Dr. Henrietta Fleck of New York University, to be used as a give-away to parents, in planned "Kiddie cooking schools" (with a lot of other gift items for prizes)--and a "Pick Up and Go" package to sell garbage disposers by home demonstration. It has a waxed paper bag left on a door knob with a request to save a sackful of food waste to grind up in next day's demonstration of a special portable disposer with a kit of attachments.

Up for Price

Harry Price, who will be the featured speaker at the next San Francisco Market in January for the appliance dinner, has just been elected president of National Appliance & Radio-Tv Dealers Assn., succeeding V. Bourland who resigned for health reasons. Price has been v-p. He made a big hit with his forthright talks to the NARDA meetings in San Francisco, Portland, Seattle and Billings in September.

NARDA plans to offer a group insurance program to its members to provide life insurance policies for customers to the amount of the unpaid balance of credit accounts. Such insurance is available in house purchases.

Insure creditors

Among various dealer groups, new officers were named: The Rocky Mountain Radio & TV Guild of Denver now known as Television Installation & Services of Colorado elected Robert A. Miller as president and Tom Sampson secretary. . . Cheyenne Appliance Dealers Assn., newly formed, elected William Heath of Automatic Electric Co. president, Robert Keefe of Keefe-Randolph vice-president, W. B. Petch, Cheyenne Light, Fuel & Power Co., secretary. . . Santa Cruz-Watsonville Gas & Electric Appliance Assn. elected Ted Colton president, LeRoy Julien vice-president. . Willamette Valley Electrical Appliance Dealers Assn., Salem, Ore., elected Douglas Yeater president, Dean Bishopric v-p and Frank W. Bishop secretary-treasurer. . . Frank C. Harford, manufacturers' rep, is president of Los Angeles Pot & Kettle Club. . . Carl O. Hagstrom, San Francisco, NARDA v-p, is chairman of the nominating committee. Keith Davis of Seattle, director, resigned; term of P. S. Urner of Bakersfield expires. . . Correction from Tucson Appliance Merchandisers Assn. We mixed up the Glenns. Glenn Johnson is vice-president of Tucson Valley Bank and treasurer of TAMA. Glenn Thomson, appliance dealer, is a TAMA director.

More election returns

Appliance Profession Assn., formed six months ago, first among dealers in San Fernando Valley, now expanded into Los Angeles, plans to ask for state licensing of appliance dealers with permission to install and service domestic appliances under Chap. 9 of the Finished Products Law. Dealers are sometimes in conflict with the state contractors license law at present, must act as agent only for licensed contractors.

Seek status of profession

Quite a musical chairs backfield shift took place among PG and E commercial managers. O. R. Doerr, vice-president, announced that E. G. Stahl retired as manager of agricultural sales and Walter D. Howell, East Bay division commercial manager, would move to the head office in his place. That moved Douglas S. Aiken from San Jose to East Bay and C. Elliott Ginochio from Marysville's Colgate division to San Jose. C. L. Doug Heller, Humboldt division commercial manager since 1945, moved to Marysville and George P. Cornwell, a native of Eureka, becomes commercial manager there.

Rotate managers

A power use section is to be set up by the Northwest Public Power Assn., made up of commercial managers of the various public power utilities. An organization meeting was called by Chairman R. C. Cornelius of Seattle City Light at Spokane Hotel, Spokane, Dec. 9 and 10. Such subjects as heat pumps, commercial cooking, weather conditioning, sprinkler irrigation, space heating, subsidization of new range and water heater load, and adequate wiring are program topics.

Feel need to sell

Promotions under way or coming up: A Beauty-plus lamp campaign is under way in Arizona Public Service Co. territory with company salesmen and customer contact personnel making direct sales of eight different models of lamps, with a special two-table-lamp and a floor-lamp package, featured at $33. . . PG and E is following up its last year's "Switch Campaign" with a mailing to all LP gas users offering a free booklet that will be delivered by dealers to interested prospects for an electric range. In January electric space heating will be promoted by big ads and poster boards, featuring both portable heaters and built-in types. . . . Southern Colorado Power Co. has featured an employee ownership campaign of washer and dryer and has a fall lamp campaign starting.

What's cooking

Show dates ahead: Third annual Audio Fair--Los Angeles, Alexandria Hotel, Feb. 10-13. . . Second National Patio & Barbecue Show, Alexandria Hotel, Jan. 23-28. . . Western Merchandise Mart Winter Market, San Francisco, Jan. 24-28, Gift and Housewares Show, Feb. 3-6. | Show time

More distributor changes: Thor Corp. has named Standard Supply Co., Salt Lake City, as distributor there. It was previously carried by Walter B. Lloyd Co. . . Arvin Radio & TV has appointed H. J. Walt Co., Sacramento, as exclusive distributor in that territory and Nides General Electric Appliance Co., Denver, for Colorado. . . While Sylvania radio and TV sets will now be handeled in Fresno, Kings, Tulare, Madera, Merced and Mariposa Counties by Mid-Cal Distributors in Fresno, the Kern County distribution is still under Gough Industries of Los Angeles. . . Ray Thomas Co. has moved from 820 W. Ash St., San Diego, to 2825 Commercial Ave., Ralph Mayott and Norman Anderson announced. . The Hobart Kitchen-Aid dishwasher line is now handled in San Diego by Jerry Achtenhagen. . . The Du Mont television line, formerly handled by Quality Distributors of Los Angeles, is now with a newly formed distributorship of Fred Stevens and Allen Stewart, former Packard-Bell distributors. . . Packard-Bell had several changes. Ace Ray, formerly of Western Holly Appliance Co., is now Packard-Bell distributor for San Francisco and San Mateo County. Norris Teakle Co., formerly Pacific-Mercury TV distributor in Oakland, now handles Packard-Bell there, formerly distributed by Don Fleming Co. Richard Duane, formerly of Montgomery Ward and Fedway Stores, and Bonar Davis, formerly Montgomery Ward, are two new distributors in Los Angeles succeeding Fred Stevens and Allen Stewart, with offices at 846 S. Robertson Blvd., Beverly Hills. And Packard-Bell opened a parts warehouse and service center at Fairview Ave. and Thomas St. in Seattle. . . Thompson & Holmes is now distributor for Preway Deluxe Bilt-in electric ranges in northern California. . . L & H Built-in Ranges are handled exclusively in San Diego by Pacific Wholesale Electric Co. . . M. J. Nicolin has returned to San Diego to represent CBS-Columbia TV and radio with headquarters at 820 W. Ash St. and Ralph Mayott joins Nicolin Distributing Co. there. . . District office of International Harvester moved from Cheyenne to Denver to a newly established general sales office. | More changes

A distributorship known as Northwest Associated Distributors Inc. to handled the Bendix radio and TV line has been set up by 40 retailers as a cooperative in Seattle. Ward Davison is president, Jack Hite v-p, John M. Schermer, attorney, is secretary, Don Nelson treasurer. It is located at 1534 First Ave., Seattle, and S. W. Grimes is manager. | Dealer co-op

Names in the news: Hadley C. Chapman, formerly v-p and gm of RCA Distributing Corp., Chicago, has moved to Los Angeles to take the place of L. E. Starkweather who stayed on after L. J. Meyberg sold out in April. . . Ed W. Meise, superintendent of residential electric sales, San Diego Gas & Electric Co. since 1945, is now manager of sales. He joined the company in 1923 as appliance salesman, has been active and past president of Bureau of Home Appliances. . . Glenn G. Geoffroy was appointed wholesale manager of Service Motor Co. Ltd., Honolulu, distributor for Easy washers and ironers, Philco radio & TV, Youngstown Kitchens, Magic Chef ranges and other lines. . . Helmuth Tamberg is now general manager, San Francisco division of Admiral Distributors Inc., where he was formerly sales manager. He succeeds Paul Dorsey, transferred to Chicago. Ed F. Swinney of the Sacramento subbranch is now sales manager in San Francisco. . . Marcia Mead, former home economist for California Electric Supply, San Francisco, and prior to that with the Leo G. Meyberg Co., has been appointed home service director of Whirlpool Corp. | News of people

Test Bulb Door Opener in Eureka

A free 150-w lamp bulb is to be used as a door opener in an experimental test by dealers and Pacific Gas and Electric Co. in the Eureka Division. If it proves a success there, the same idea may be offered in other divisions.

In past experience the door-opener gift has been found a material aid in building a satisfactory reception from housewives to those doing house-to-house canvassing. The objective is to improve the effectiveness of door-to-door salesmen and to build a backlog of prospects for future business. In the test campaign, the prospects are not limited to electric appliances although these will be the featured items. Furniture and floor coverings are also included. The trial plan extends over a period of five weeks.

PG and E furnished card forms with names and addresses of customers taken from its meter routes. These cards are to be used by the salesman in making calls and are completed by him, then turned in to PG and E for consolidation of information. After this is done, the cards will be returned immediately to the salesman to use as a future prospect list. The division of the residential territory to be covered was made by agreement with the dealers participating, the several areas to be worked allocated as nearly as possible on an equitable basis. Spot checks later to see customers may be used as a follow-up.

"Hard Way" Ads Ease Dryer Sales

A dryer campaign and a big dealer meeting addressed by Mort Farr are two major events announced by the Salt Lake Retail Chapter of the Intermountain Electrical Assn. The annual fall dryer campaign began Oct. 20 with a "large splash of ads in all Salt Lake papers" with a campaign theme "Why Do It the Hard Way" carried by Utah Power & Light Co. Numerous TV and radio spots will also be used in the campaign, as well as by Utah Power & Light Co. in its own advertising.

On Nov. 16 an evening dinner of the retail chapters of IEA will be held to hear Mort Farr of Upper Darby, Pa., former president of NARDA and one of the outstanding appliance and TV dealers in the nation.

Echoes from the very successful Profit Clinic in Seattle of the Northwest Appliance and Television -Radio Assn. in September continue to rebound in the area. James Marks, NATA executive secretary, Charles Le Guyer of Gene Fiedler Appliance, Seattle, who was general chairman of the Profit Clinic and Lib Tufarolo, Lib's Bellevue Electric, NATA president, all of whom made the second such NATA annual event a real success

Jubilee Campaigns Spark Business

Any dealer who failed to cash in on the tremendous publicity connected with the Diamond Jubilee of Light has only himself to blame, for certainly no national event has had more to publicize it. And in the West all utilities advertised the event and a majority staged special campaigns in connection with the Electrical Week and the Diamond Jubilee.

San Diego Gas & Electric dedicated its new Encina steam plant, Southern California Edison Co. named a lake after Edison, Pacific Gas and Electric dedicated its huge new Pittsburg steam plant, Public Service Co. of Colorado conducted a press tour of its Zuni plant. In Hawaii a model electric home was opened and Honolulu *Advertiser* lighted a 50-kw lamp atop of its building. In Seattle City Light had window displays and a civic function commemorating Edison. In Arizona the bands of 15 high schools and Arizona State College spelled out "Anniversary" on the lighted football field at Tempe. Montana Power held a big open house at its Butte headquarters. In Los Angeles the mayor proclaimed Electric Week and the Department of Water & Power and Electric League advertised it. Southern Colorado Power Co. made it the theme at the Colorado State Fair. Such were some of the many and varied celebrations of this occasion.

Tied to the event were a number of selling and promotional campaigns. Throughout northern California in PG and E territory a $20,000 electric jubilee prize contest was conducted. Customers of the company received a bill stuffer (or could use a coupon in its ads) to enter for a drawing of major electric appliances. They visited a dealer store displaying a colorful poster, decided what appliance they wanted to win, wrote it on the entry coupon with name and address and deposited it. The public response was heavy and many dealers took full advantage of the opportunity it offered to show and demonstrate their top-of-the-line appliances to the people coming it. Others, as always, ignored this opportunity, some even complained of being bothered by the traffic. But no gimmick in recent years has brought in as much floor traffic. Those who welcomed it will have the entry blanks returned as prospects to be followed up. A surprising number asked to win freezers, the coupons showed.

In Montana Power and Arizona Public Service areas there are still going Beauty-Plus and lamp-bulb selling campaigns given impetus by the Jubilee publicity. The theme will even be carried into Christmas sales drives.

EEI T&D Group Takes Important Actions

Two important actions were taken at the meeting of the transmission and distribution committee of the Edison Electric Institute held in San Francisco Oct. 6-8. First was a recommendation by the subcommittee on aluminum conductor fittings to the full T&D committee that research at Armour Research Foundation be continued without delay into phase II of the connector problem and that conductor and fittings manufacturers now be invited to participate.

R. N. Coe, Southern California Edison Co., chairman of the subcommittee, reported that phase I of the program has been completed. This has consisted of examination of 410 field samples of bolted connectors, defining of the problem and search of the literature on the subject. Phase II would have as an objective a set of performance specifications. Coe said it had been determined that failure of fittings is primarily because of creep and unequal thermal expansion, causing oxidation.

A second important action taken at the meeting was in connection with power factor of air conditioning equipment. Clive Baugh, Pacific Gas and Electric Co., expressed satisfaction with the agreement of the joint ARI-EEI-NEMA committee in establishing power factors of 75% for ⅓ hp motors, 80% for ½ hp and 85% for ¾ hp and larger motors, to become effective with 1956 equipment, as an interim measure, but felt that as a terminal objective an over-all power factor of 90% for any piece of air conditioning equipment be sought, effective as soon as possible and not later than 1957 equipment. A vote of the T&D committee members indicated this to be the unanimous desire of the committee.

A symposium of four papers on a selective street tree planting program to reduce the rate of increase of tree trimming expense showed that several utilities in the country are having a large measure of success with such programs. Objective is to secure public support for the planting of types of trees with growth characteristics best for the city, the public and the utility.

E. G. Stahl, Pacific Gas and Electric Co., reported results of 16 months active promotion and selling of such a program by his company. He said that 34 out of 164 cities and towns served have adopted ordinances controlling the type of street trees that can be planted. Stahl expects that about three years will be required for education and promotion and that after five years a reduction in the acceleration of tree trimming cost can be expected.

Several other papers were presented by PG and E engineers. B. L. Peter described PG and E's radial underground system; F. B. Schullerts discussed the practical aspects of PG and E's 110-kv cable installations; R. N. Lesley gave a paper on planned safety in transmission and distribution construction; E. F. Hockenbeamer told of the outstanding success of the company's driver education program in reducing automotive accidents; and E. M. Wright presented a strong case for all-aluminum conductors based on many years of PG and E experience.

Walter Dreyer, vice-president and chief engineer of PG and E, made a most interesting talk at a luncheon meeting on his company's postwar power development program. He said PG and E has spent $1,174,400,000 since 1946 for which 2,955,800 kw of new generation will have been brought in by 1956.

Three other papers came from West Coast engineers. The Salt Lake City underground system was described by R. S. Patrick, Utah Power & Light Co. R. C. Blankenburg, Southern California Edison Co., gave details on his company's low-cost radial systems for small underground areas. R. E. McCann, Southern California Edison Co., gave the reasons for and preparation of the uniform accident prevention rule book used by all member companies of the Pacific Coast Electrical Assn.

Progress Reports

Progress reports were presented by the several subcommittees of the T&D group. The committee on compression connectors suggested a new joint EEI-NEMA committee be formed to work on standardization of compression fittings to bring about complete adaptability of hand and power tools for all compression fittings for wire sizes up to 1/0.

The trend toward higher utilization voltages was noted by T. C. Duncan, Consolidated Edison Co. He said that 240/480 v vs 120/240 v for residential distribution was being studied and that manufacturers are being consulted on the effect on appliances. For industrial and commercial loads a decision must be made as between 240/416, 277/480 and 265/460. The latter voltage combination is meeting with favor by some, he said.

F. A. Ashbaugh, reporting for the timber products subcommittee, said that as a result of the ASTM testing program there is prospect of upgrading of wood poles with a possible saving to users of $1,000,000 annually.

This was the first meeting of the T&D committee ever held on the West Coast. As a treat for those from the East, Pacific Gas and Electric Co. was host on a trip to Monterey Bay, visiting Moss Landing steam plant, Carmel, and the 17-mile drive. Lunch at Del Monte Lodge at Pebble Beach topped off what was acclaimed a perfect day by the Easterners.

AIEE

Vancouver Section, American Institute of Electrical Engineers, elected H. O. Bulmer as chairman for 1954-55 season. J. T. Turner is vice-chairman, R. B. Carter secretary-treasurer, M. A. Thomas assistant, L. B. Stacey member-at-large, R. C. Stewart chairman, meetings and papers, M. Bradwell chairman, membership, and E. Wolstencroft chairman, discussion group. The Oct. 4 discussion group was addressed by F. J. Bartholomew, consulting engineer, Electro Power Equipment Ltd., Vancouver, who described Egypt and Palestine. F. O. Wollaston, superintendent, engineering design, B. C. Engineering Co. Ltd., Vancouver, described the Dal Grauer substation gas pressure cable.

EMEA

Electrical Maintenance Engineers Association of Southern California heard Milton A. Brenner, Brenner-Fiedler & Associates, representative of Esterline-Angus Co., discuss graphic instruments and their application in trouble shooting, preventive maintenance, production process control, monitoring, plant surveys, etc., at its Oct. 20 meeting.

SVEL

Sacramento Valley Electric League re-elected C. N. Coppin as its president and elected Jay Kaspari vice-president, W. F. Cahoone, Robert A. Moore, Ralph Baker and Johnnie E. Wood as directors. George Cane is secretary. First meeting of the year was addressed by Howard Emerson, Pacific Coast editor, *Electrical Merchandising*, Oct. 20.

'COPTER VIEW OF PG&E'S Pittsburg station, largest in PG&E system, shows four G-E turbine-generators.

4 G-E turbine-generators to produce 600,000 kw at new PG&E steam plant—largest in West

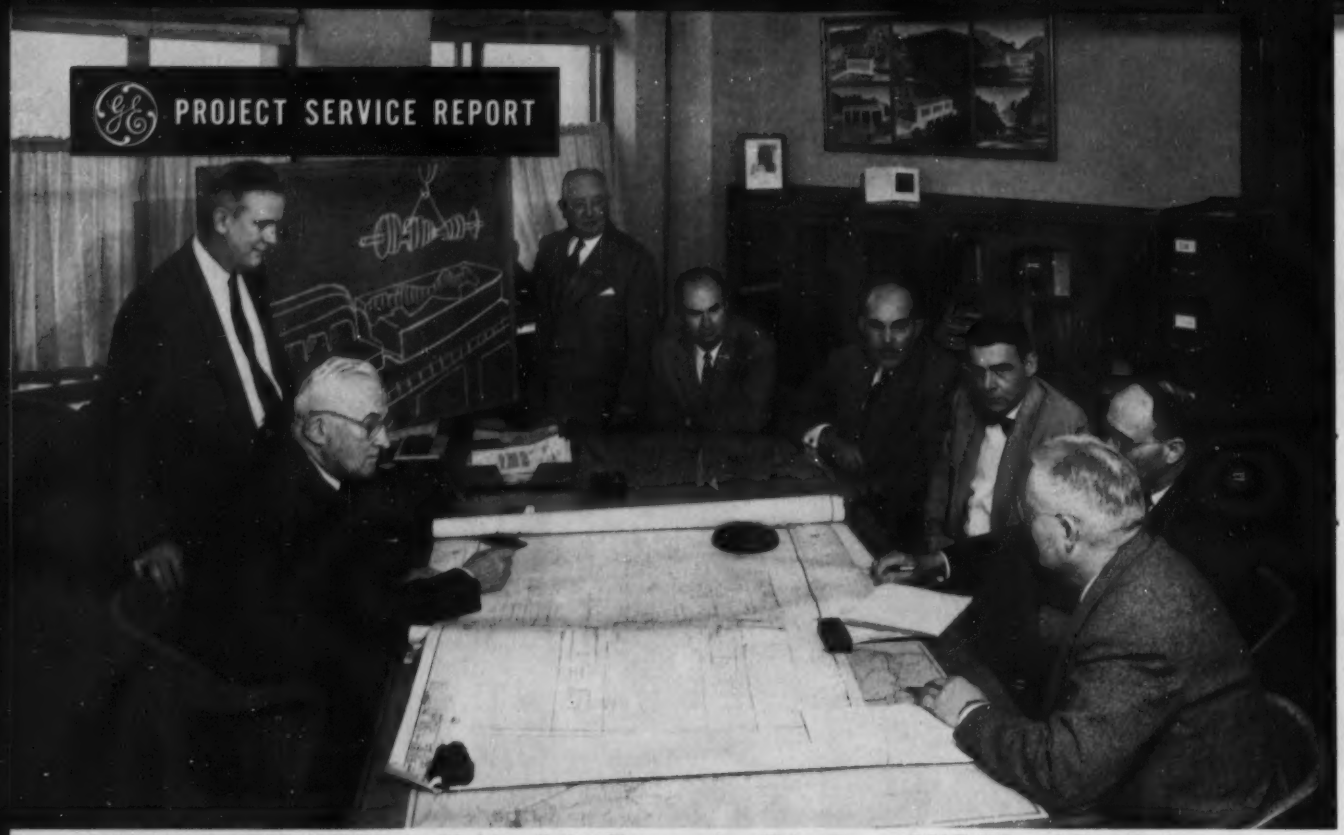
Highlighting Pacific Gas & Electric's new Pittsburg, California, plant are four General Electric turbine-generators. These units, part of the 75-million-dollar project, largest of its kind west of the Mississippi, provide the Pittsburg station with a nominal operating capacity of 600,000 kw and a maximum capability of 625,000 kw.

Backing up efficient planning by PG&E and Bechtel Corporation, engineers and constructors, General Electric engineers made vital contributions which helped achieve on-time start-up, and low cost per kw.

GENERAL ELECTRIC

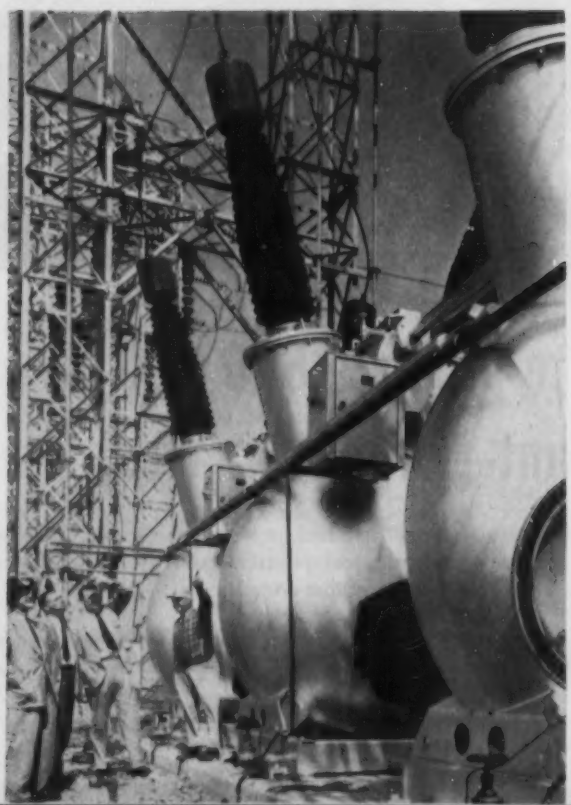
For installation story, see next page

PROJECT SERVICE REPORT



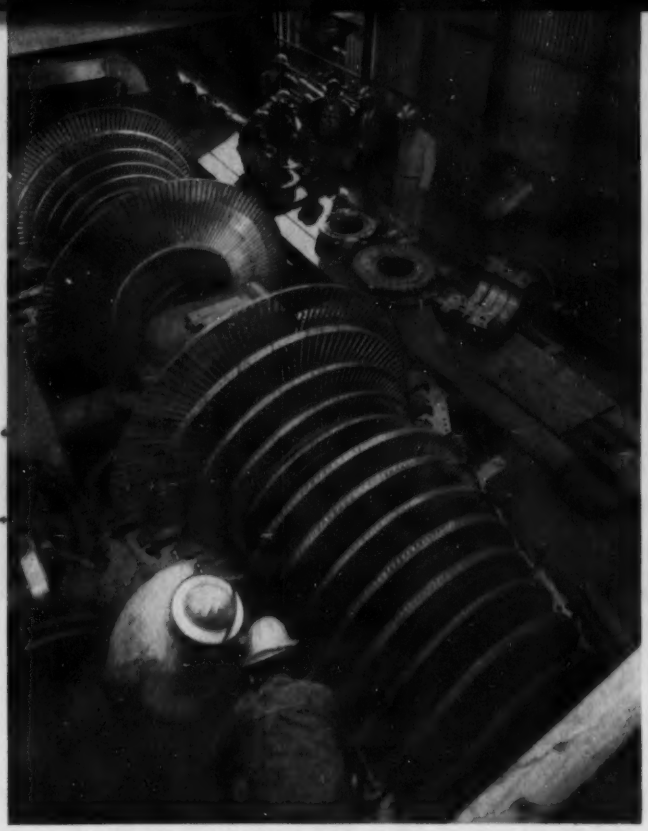
OVER-ALL JOB COORDINATION simplified installation. Here at one of several planning meetings, M. S. Barnes, G.E. (third from left), discusses technique of lowering rotor into frame of turbine with (l to r) R. A. Bowman, Bechtel Mgr. of Engineering; Walter Dreyer, PG&E V.P. and Chief Engineer; J. Kiely, Bechtel V.P.; A. J. Swank, PG&E V.P., General Construction; J. D. Webster, G.E.; F. E. Baxter, PG&E Manager, Purchases; C. C. Whelchel, PG&E Chief, Steam Engineering.

Project teamwork by G.E., PG&E and



ALL SHIPMENTS ON SCHEDULE meant faster construction, earlier start-up for Pittsburg station, thanks to simplified ordering, scheduled equipment production and delivery through G-E Project Service.

ENGINEERED AS A PACKAGE, entire switchyards can be supplied through G-E Project Service. Here, G-E installation engineer J. Anderson discusses safety features of 230-kv breakers with Karl Bausch, Bechtel Chief Electrical Engineer, Power Division; Ray Stater, Bechtel Supt. of Construction at Pittsburg plant; and J. D. Webster, G-E Sales Engineer.



CAREFUL SUPERVISION of installation, part of G-E Project Service, is given by R. Yanofsky, G-E Turbine Installation Supervisor; W. Todd, PG&E Engr.; J. F. Del Curo, Bechtel Chief Mech. Engr.; W. A. Youker, G-E millwright foreman.

FAST INSTALLATION of 2250-hp G-E Boiler Feed Pump Motors resulted from careful planning in early stages and coordinated shipment. G. E. Green, G-E Motor Specialist; J. F. Del Curo; and R. Stater watch final wiring.

Bechtel keeps construction costs low

Reduced installation costs result from PG&E's and Bechtel's use of sound design and new engineering trends

FUNCTIONAL LAYOUT of three 220/127-kv G-E transformers is discussed by G. E. Bachman, Bechtel Supervising Engineer; R. C. Prince, Bechtel Engineer; G. B. Gilcrest and C. L. Phillips, G-E application engineers.

With General Electric providing engineering aid, making apparatus delivery schedules coincide with construction progress, and supplying thorough installation service, the Pittsburg plant, a tribute to the farsighted electrical utility industry, was ready to fill California's growing power needs.

By contacting your Apparatus Sales Office early in the planning stages of your new expansion or modernization you will obtain the greatest benefit from G.E.'s project services. A team of experienced G-E engineers can assure unified responsibility. Behind this team, the vast resources of General Electric stand ready to give ordering, engineering, design, manufacture, shipping, and installation service.

GENERAL ELECTRIC

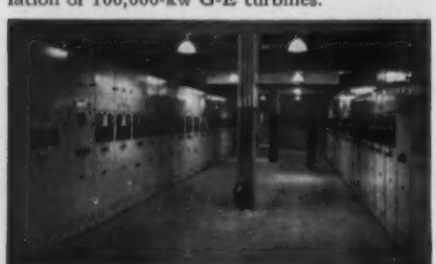
More station details on next page ➧

COMPLETE ELECTRICAL COORDINATION plus on-schedule production and delivery of all electrical apparatus through G-E Project Service helped cut cost of giant Contra Costa station for Pacific Gas & Electric.

TRAINING OPERATORS to handle equipment like these carrier current communication units is assured by G-E Project Service.

VALUABLE ENGINEERING TIME is saved—through G-E Project Service, all this switchyard equipment can be ordered, coordinated.

ENGINEERING THOROUGHNESS under G-E Project Service sped delivery, simplified installation of 100,000-kw G-E turbines.



COMPACT EQUIPMENT, like this metal clad switchgear helps reduce space requirements.

Sound design practices helped cut Contra Costa costs for Pacific G&E

Project Team helped Bechtel meet PG&E's start-up deadline for 575,000-kw station

Like its Pittsburg installation, PG&E's 575,000-kw Contra Costa station typifies the cost-saving advantage of sound engineering supported by General Electric project services. Here, too, a G-E Project Team coordinated its efforts with PG&E and Bechtel engineers. Headed by a G-E Sales Engineer who drew extensively on General Electric's vast manufacturing and testing facilities, the teamwork of the application engineer, the system and product specialists, and coordinators helped provide faster construction, lower installation costs for PG&E.

For full data on G-E project services, contact your nearest Apparatus Sales Office. Or write for GEA-6032 to General Electric Co., Section 302–4, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

Inspectors from five states and eastern code experts met in Portland for an annual meeting that gave inspectors what they want—

Code Discussion Aplenty at Northwest IAEI

"Particularly successful from an inspector's standpoint," said W. L. Gaffney, secretary-treasurer of the Northwestern Section, International Association of Electrical Inspectors, speaking of the annual meeting at Portland, Sept. 23-25. "For two full days were given to code discussion and the members took full advantage of the opportunity. When our members will come to a meeting, present their problems, viewpoints and suggested code changes as they did at this meeting it is a satisfaction to all who worked hard to prepare for it."

Only three features outside of code discussion were programmed. On Thursday, after the addresses of John R. Crawford, Butte city inspector, president of the section, and IAEI President B. A. McDonald of Rochester, N. Y., Robert S. Moulton, technical secretary, National Fire Protection Assn., Boston, described the work of his organization and the active participation in it by the electrical industry. A moving picture, *Pathway to Power,* by Rome Cable Co., was shown on Friday. And Everett F. Cogan, technical assistant secretary, IAEI, outlined the activities of the inspectors' organization.

Then after these usual preliminaries and brief reports the section settled down to a session devoted entirely to code panel reports and discussion of inspectors' problems. Moderators during these deliberations were Merwin Brandon, Underwriters' Laboratories Inc., Chicago; H. H. Watson, General Electric Co., Schenectady; C. M. Kirsop, Olympia chief inspector; J. C. Hewitt, Washington State chief electrical inspector; Everett Cogan, IAEI, and Joe Gray, Portland city inspector. Sessions were presided over by J. R. Crawford, Butte, president; J. C. Hewitt, first vice-president, and Cliff Atkins, Portland, second vice-president of the section.

Code permission of switch control of 277-v lighting circuits under special conditions was questioned because of possible substitution of 120-v switches by maintenance men. Brandon indicated that it is not economically feasible to rate all switches for the heavier duty with the present limited field of application. Also in this connection, the limitation of such lighting circuits to "large" schools, etc., was explained by the fact that a 480/277-v supply is not normally available from a utility system and would therefore only be used for large installations where the customer supplies his own transformation. In commenting, Watson indicated that about $30 a kva of installed lighting load could be saved by using the 277-v system.

As an off-shoot of a discussion of problems of interchangeability between the new 30-amp and present 50-amp cord and receptacle for clothes dryers, and the incipient use of dryer circuits for auxiliary ranges, the section went on record favoring a modification of Section 2123(b). It was pointed out that Section 2123(b) covers two or more receptacles on a circuit with no specific reference to a single receptacle on a circuit. The following recommendation was approved to correct this situation. "2123(b) Receptacles. Receptacles shall have a rating not less than the load to be served and shall conform to the following—"

A question as to the type of receptacle to be used for grounding 120-v appliances rated over 15 amp was raised. Brandon stated that an ASA section committee is making a study of the various possible blade configurations that can be used to provide non-interchangeability, the results of which should be helpful in settling some of the receptacle problems.

Relative to the labeling of lighting fixtures, Brandon made it very clear that unless a manufacturer indicates that a fixture is intended for outdoor use, the fixture will be subjected to indoor fixture examination and be labeled if satsfactory for such use even though its design may lead to outdoor use.

Representatives of IBEW requested the section to take action to bring the inspection of luminous ceiling installations under the jurisdiction of the electrical inspector. There appear to be two types of such ceilings, one which is sus-

pended from the lighting fixture supports and another separately supported. IBEW contended both were for the diffusion of light and therefore part of the fixture or lighting installation. Inspectors did not appear anxious to undertake structural inspection. A committee was appointed to review this matter and make a recommendation.

The section agreed that the code should specifically prohibit the installation of service entrance equipment in certain locations. The following recommendation was approved to be passed on to Section Panel 13 for consideration, "Service cabinets shall not be installed in bathrooms, attics, toilets, fuel bins, closets, cupboards, over sinks or in similar locations."

There was a discussion of certain makes of circuit breaker entrance panels having widely separated single breakers with ineffective ties to meet the six breakdown limitation for services. Brandon stated that such equipment was not in accord with the intent of the code. Possible code language to cover this situation was discussed since it was felt there was a hazard associated with the long handle ties but no formal action was taken.

It was noted that Section 2352 does not include connections for sprinkler alarm systems ahead of the mainline disconnect as required in NFBU pamphlet No. 72. The section went on record recommending the inclusion of sprinkler alarms among the connections permitted on the supply side of the disconnecting means in this section.

The plug fuse controversy was again brought to the fore and the status of the fine print note following Section 2452 was discussed together with fuse developed by the special NEC committee. The committee fuse could be installed in an Edison base with or without an adaptor, meeting the desires of the utilities and providing the tamper resistance desired by inspectors when used with an adaptor. After some argument it was recommended that the fine print note be deleted and that language be inserted which would allow the enforcing authority, after due process, to permit the use of a fuse which can be inserted in an Edison base fuse holder. This was considered in the nature of a compromise which would not exclude the NEC committee fuse when and if available. C. S. Alger, Puget Sound Power & Light Co., argued for a logical compromise of requiring the use of one of two types of fuses, the type S or the utility version, which would take the inspectors a long way in their fight for tamper resistance and possibly satisfy the utility people. However this was rejected.

The question was raised as to whether paragraph (f) of Section 5135 applies above the 5-ft level in anesthetizing locations, in view of the statement contained in paragraph (b)2 of that section. It was stated that movable lighting fixtures and X-ray equipment supplied from above the 5-ft level can be moved into space below that level. Brandon agreed to take this matter up with the proper committee.

In line with a suggestion from Section Panel 6 a recommendation to remove the 500,000-cm limitation on the paralleling of conductors in Section 3105 was approved. It was proposed that this section be changed to read, "Conductors in Multiple. Conductors 1/0 and larger may be run in multiple . . . ."

After a discussion of the failure of some manufacturers to properly identify the type of conductors in multiwire cables, particularly U.S.E., the section went on record favoring the rigid enforcement of Section 93101.

The hazards of pendant push-button controls, particularly on job built logging equipment sometimes operated at 480 v, were described and the matter was referred to Section Panel 12 for a suggested addition to Article 610 to cover.

As the result of the promotion by certain manufacturers of two element storage water heaters of the fast recovery type and with interlocking (load limiting) thermostats, an inquiry was made as to the circuit capacity required for such heaters. Cited as an example, was a 9-kw heater having two 4.5-kw elements with load limited to 4.5 kw by the interlock feature. The name-plate rating of this heater would indicate 9.0 kw, and, in fact, by a simple change the interlock can be bypassed so that the elements can operate simultaneously. It was the consensus of the inspectors present that they would require circuit conductors suitable for the total rated capacity of both elements.

The following officers and executive committee were elected: president, J. C. Hewitt; first vice-president, Cliff Atkins; second vice-president, H. S. Morr; secretary-treasurer, W. L. Gaffney; executive committee: P. H. Forte, J. A. Paxton, J. D. Gawne, T. M. Widrig, J. H. Stayner, O. A. Alderman, J. R. Crawford; executive council: E. B. Morrison, W. R. Volheye; alternate, W. L. Gaffney.

Selection of the next meeting place was referred to the executive committee. Invitations for the 1955 meeting were received from the cities of Ogden, Utah, and Yakima, Wash.

Registration for the meeting was 150 with the addition of some 40 ladies who were taken through the Jantzen Woolen Mills and to a luncheon and tour of the lower Columbia gorge.

This was an excellent meeting which ran smoothly and well as the result of the unsparing efforts of Mel Evans of the Portland General Electric Co. and his committee.

Electric Clubs

Los Angeles Electric Club celebrated the Diamond Jubilee of Light Oct. 18 with talks from Edison Pioneers Charles Schallis and Harry A. Sweetnam. Dwight C. VanMeter of N. W. Ayer & Son, New York, described the preparation of the two-hour telecast for Oct. 24. The Oct. 11 meeting was addressed by Sidney Siegel, assistant director, atomic energy research department, North American Aviation, on "The Prospects for Atomic Power." On Oct. 4 Frank E. Bodine, Westinghouse, San Francisco, presented his wide-screen "Ten Years of Opportunity—If!"

East Bay Electric Club, Oakland, had a talk and demonstration by Norman F. Barnes, manager, laboratory information services, G-E, Schenectady, at its Oct. 25 meeting; and on Oct. 18 Leo Kass presented the Light's Diamond Jubilee promotion program of PG and E.

Oregon Electric Club on Oct. 7 heard the story of Pacific Power & Light Co.'s Yale project with a new film presented by John Dierdorff, vice-president, PP&L. On Oct. 21 Charles R. Long, Pacific Coast regional engineer, Westinghouse Lamp Division, San Francisco, spoke on "Light for Freedom, Power for Progress," the theme of Light's Diamond Jubilee.

San Diego Electric Club, which had been meeting for luncheon in the Maryland Hotel and later for a meeting in the conference room at San Diego Gas & Electric Co., has now begun again having its meetings at Cafe Del Rey Moro in Balboa Park, beginning with the Oct. 18 meeting. Plenty of parking space makes this a good location.

Pot & Kettle

Dave Bartelme, manufacturers' representative, San Francisco, is now president of the Associated Pot & Kettle Clubs of America. Armand Schwartz, Seller Bros., San Francisco, has become president of the San Francisco club to succeed James Anderson.

BTAA

Boise TV & Appliance Assn. recently elected Pat Powell as its president, Ernest Argyle secretary and Allen Shaver treasurer.

F. L. Snyder, Westinghouse Vice-President, with four of the transformer types involved in major design improvements.

For 1955 . . . a complete new line of

Westinghouse Pole-Type Transformers

Once again—Westinghouse is proud to present to the industry new transformer design advances affecting the complete line of pole-type distribution transformers in ratings from 3 to 167 kva, single phase.

For years, Westinghouse has consistently set the industry pace with transformers of advanced functional design. The "CSP®", "CSPB®", Hipersil® cores, Coastal Finish and many other design advances are evidence of this leadership.

The specific features of this outstanding new transformer line are presented on the following nine pages in a manner which we believe will be helpful in analyzing the many advantages.

Improved design assures

More resistance to corrosion . . . superior tank sealing . . . greater simplicity in installing, operating, maintaining

Westinghouse engineers, in designing this new line, have consulted with many electric utility customers to set a new criterion for transformer dependability. The result is more for your transformer dollar than ever before.

The new Westinghouse pole-type transformer line presents new features which prevent *corrosion*. Moisture-entrapping seams and crevices along with corrosion-vulnerable hardware are eliminated.

Openings for bushings, breaker handle, as well as the joints between the tank rim, main cover and handhole cover, have been effectively sealed to prevent the entrance of moisture, air or foreign matter. As a result, the life of the transformer is greatly increased.

Other features simplify installation, operation and maintenance . . . get the transformer "on the line" easily and quickly and keep it there.

Here's what we've done to eliminate corrosion

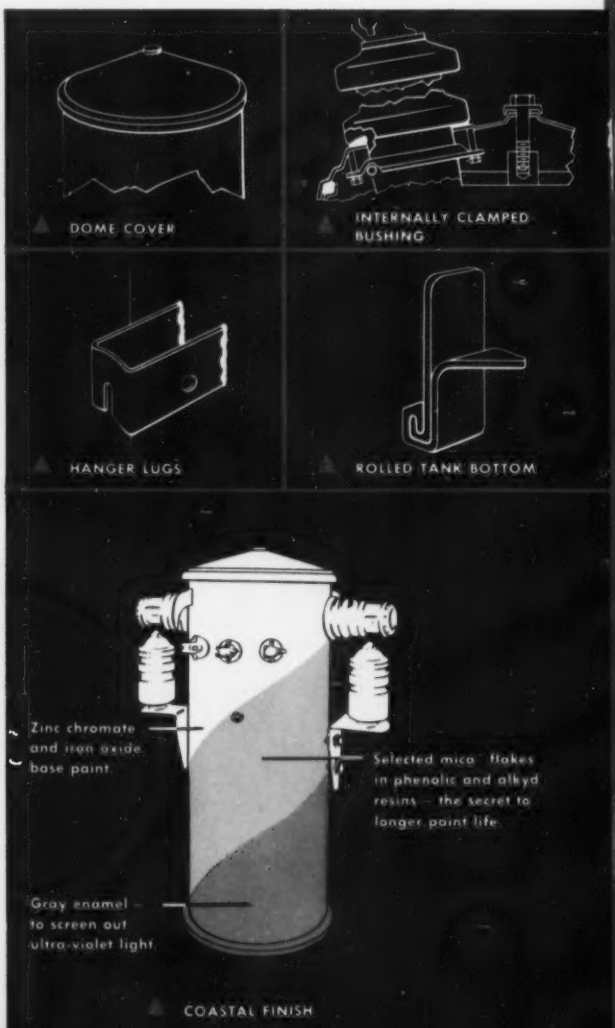
▲ **Dome cover** with unique single-captive retaining bolt assures positive runoff of water—eliminates all cover clamps, retaining rings and exposed threads. Nothing to corrode—complete paint coverage attained.

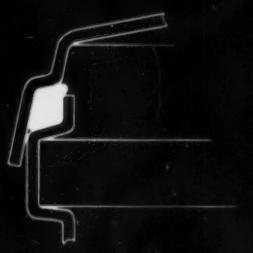
▲ **New, internally clamped bushings** eliminate external bushing flanges and threaded studs. High-voltage cover bushings are mounted on a raised boss to assure water runoff. Again—nothing to corrode.

▲ **Hanger and lifting lugs** are flash-projection-welded directly into the tank wall, thus eliminating all crevices and the corrosive hazard of moisture traps.

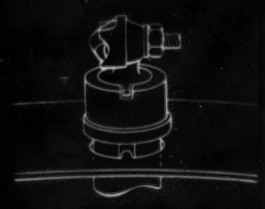
▲ **Rolled tank bottom** with paint flowed in and a tapered water shed prevents moisture entrapment.

▲ **3-coat Coastal Finish,** flowed on, affords protection against corrosive atmospheres . . . designed to last twice as long as ordinary transformer paints.

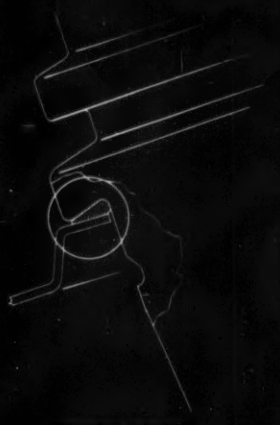

▲ DOME COVER
▲ INTERNALLY CLAMPED BUSHING
▲ HANGER LUGS
▲ ROLLED TANK BOTTOM
Zinc chromate and iron oxide base paint
Selected mica flakes in phenolic and alkyd resins — the secret to longer paint life
Gray enamel — to screen out ultra-violet light
▲ COASTAL FINISH



TANK COVER GASKETS



INTERLOCKED BUSHINGS

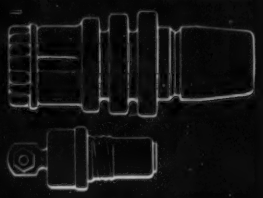


BUSHING GASKETS

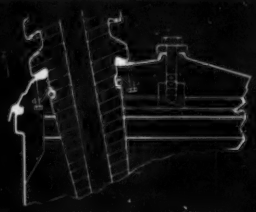
RUBBER BASE CEMENT

O-RING SEAL

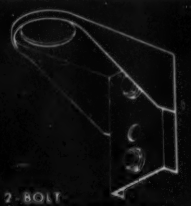
HEIGHT REDUCED



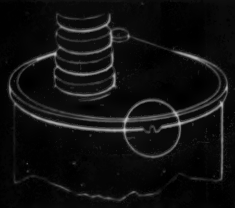
ALUMINUM OR COPPER LEAD



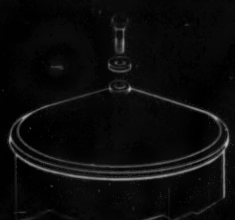
BUSHING CROSS SECTION



2-BOLT ARRESTER MOUNTING



COVER CENTERING DEVICE



ONE BOLT (CAPTIVE) INTERIOR ACCESSIBILITY

SIMPLIFIED HOOK-STICK OPERATION

These features assure superior tank sealing

● **All bushings are sealed** with cork-Neoprene gaskets restricted within undercut areas. Any gasket flow serves only to make the joint more secure.

● **New, interlocked low-voltage bushings** prevent any possible breaking of the bushing seal during installation or maintenance.

● **Tank cover gaskets,** like bushing gaskets, are retained in confined quarters. Constant gasket pressure on both the main cover and handhole cover is maintained throughout the gasket periphery and under changing temperature conditions by the spring-follow action of the cover assembly.

● **Rolled tank bottoms** formed with five thicknesses of steel are even more securely sealed with rubber-base cement applied during fabrication.

Here's why these transformers are easier to install — operate — maintain

■ **Over-all height** of 25, 37½ and 50-kva, wall-mounted bushing units has been reduced to permit mounting on existing "joint-use" poles when "change-outs" to larger sizes are necessary. Reduced height still meets EEI-NEMA standards—hanger lug spacing.

■ **HV and LV bushing terminals** are designed to accommodate *either* copper or aluminum line leads.

■ **Bushing cross-sectional area increased** where it enters the tank wall. Rigidity and strength are improved. Internal mounting arrangement simplifies maintenance.

■ **New "Valvex" expulsion arresters** are mounted on the tank wall simply with two bolts, thus permitting easy adaptability to any line arrangement.

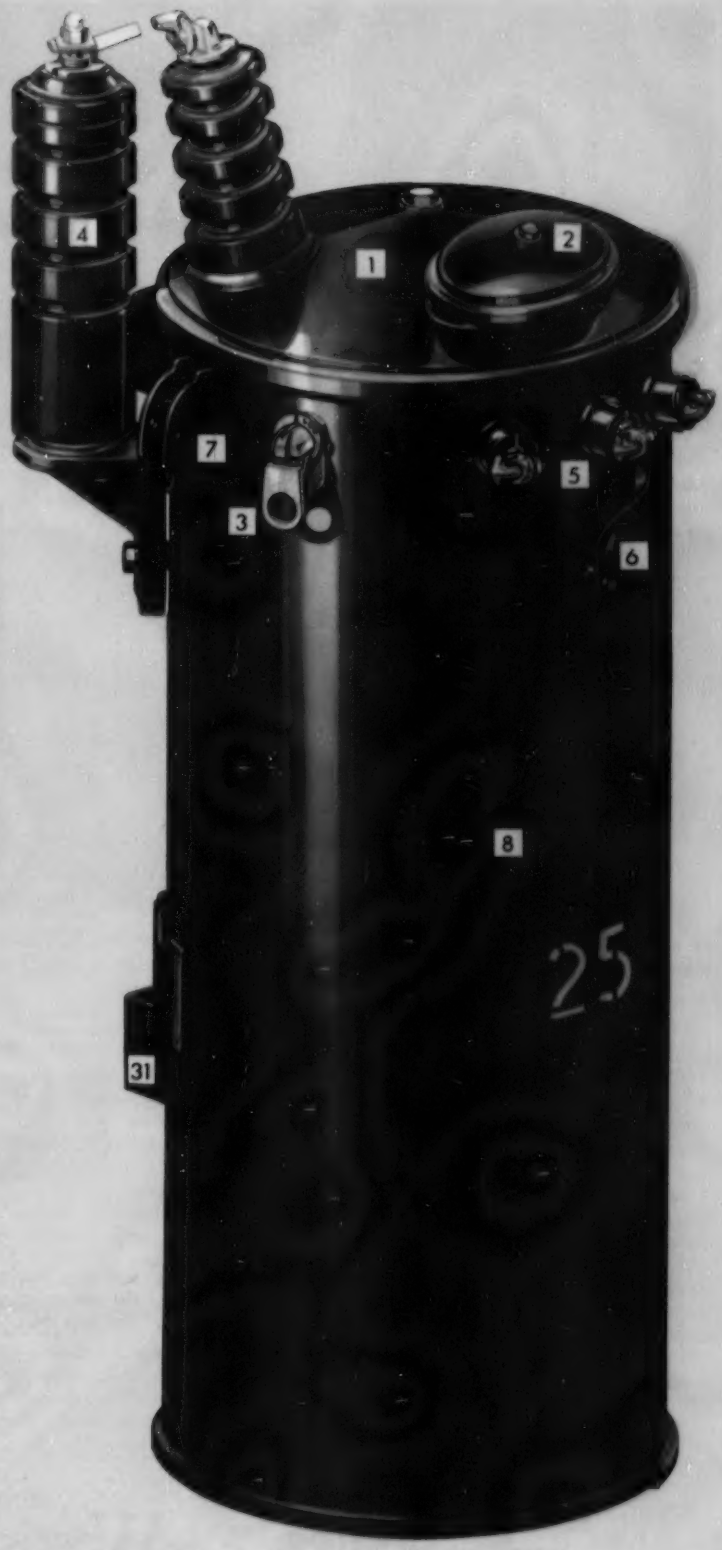
■ **Cover centering device** for transformers with cover-mounted bushings assures quick, correct positioning of tank cover.

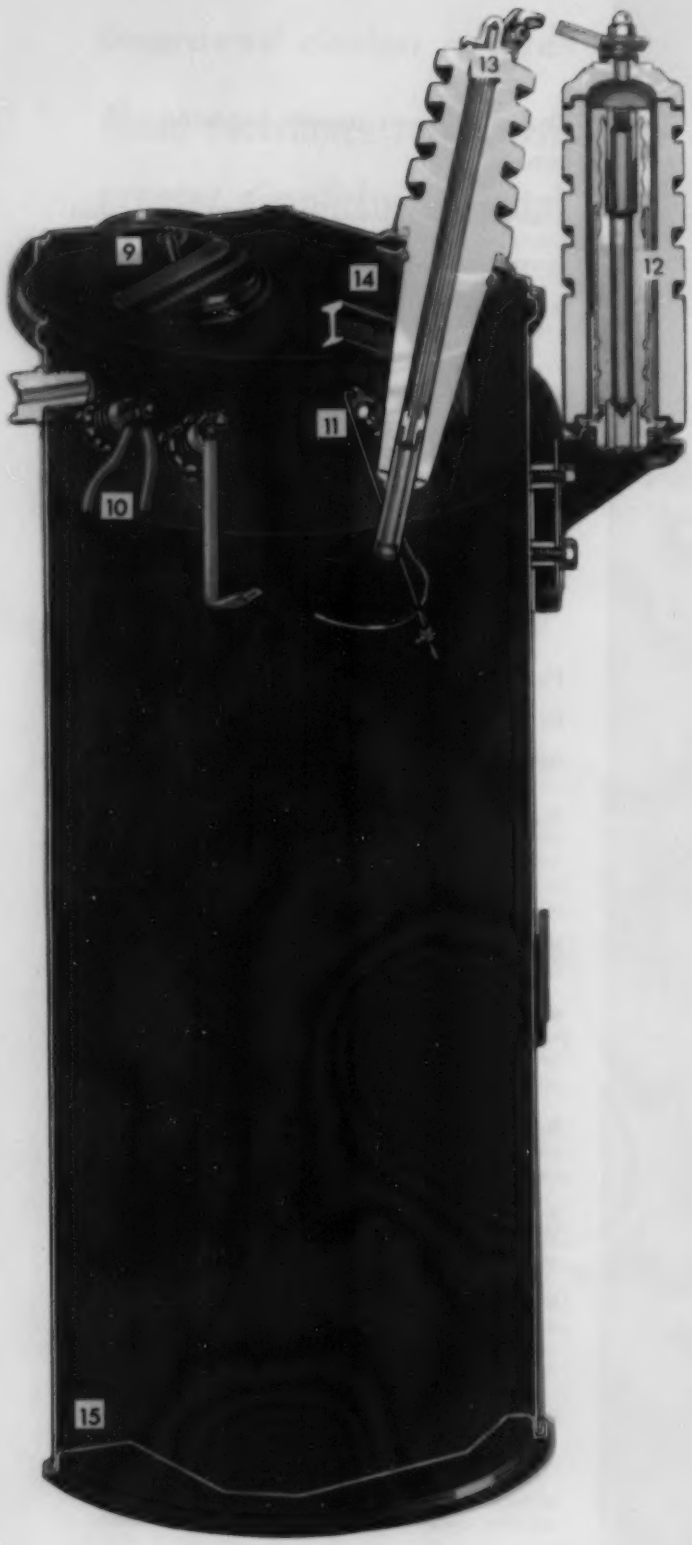
■ **Accessibility to transformer interior** is facilitated by removal of just one bolt. Bolt is captive in the cover—cannot be lost. Positive seal assured when cover is replaced.

■ **Breaker handle** operation is now possible with but a touch of the hookstick. The new O-ring seal assures a tight joint around this handle.

■ **Stamped identification** of low-voltage leads from winding makes reconnection easy when necessary.

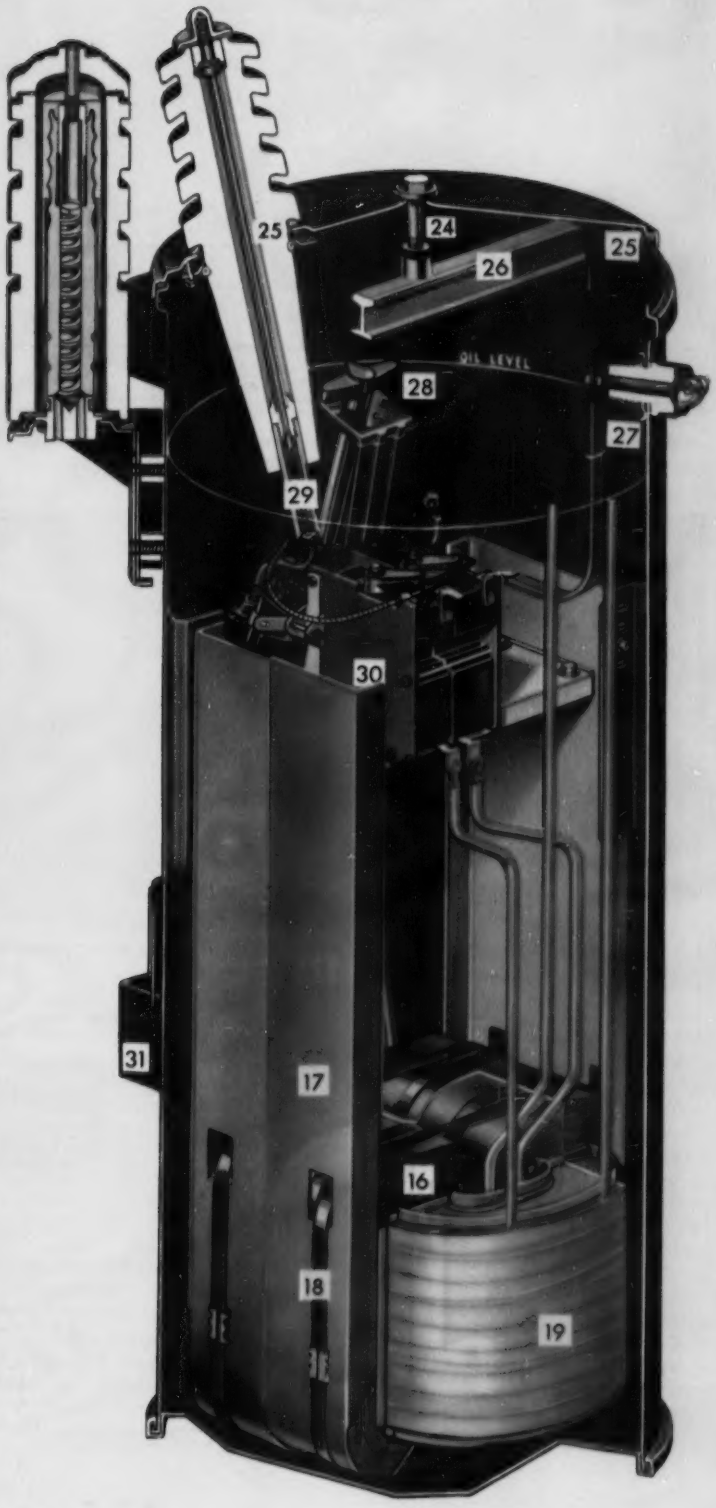
1. High Dome Cover
2. Handhole Cover
3. Breaker Operating Handle with O-Ring Seal mounted behind handle
4. "Valvex" Expulsion-Type Lightning Arrester mounted simply with two bolts
5. Low-Voltage Interlocking Bushing. Terminals suitable for aluminum or copper conductors
6. Grounding Strap
7. Lifting Lug
8. Coastal Finish

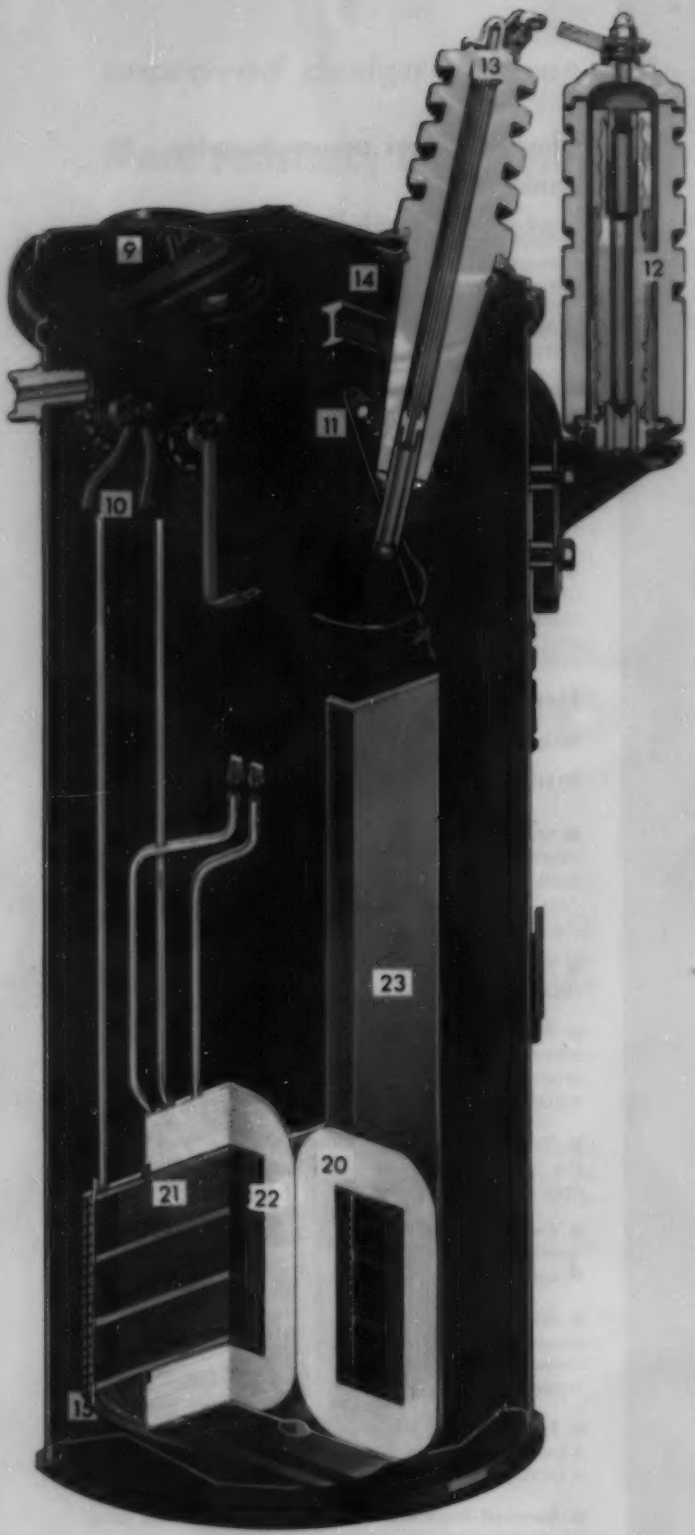




9. Handhole Cover Clamping Assembly
10. Low-Voltage Bushings
11. Breaker Operating Handle Mechanism
12. "Valvex" Expulsion-Type Lightning Arrester
13. High-Voltage Bushing Terminals suitable for aluminum or copper conductors
14. Inside mounting for High-Voltage Bushing
15. Rolled Tank Bottom

16. Hipersil® Core
17. Wrap-Around End Frame
18. "C" Core Banding Strap
19. Winding





20. Hipersil® Core
21. High-Voltage Winding
22. Low-Voltage Winding
23. Wrap-Around End Frame

24. Captive Retaining Bolt

25. Gaskets in confined quarters

26. I-Beam Clamping Bar

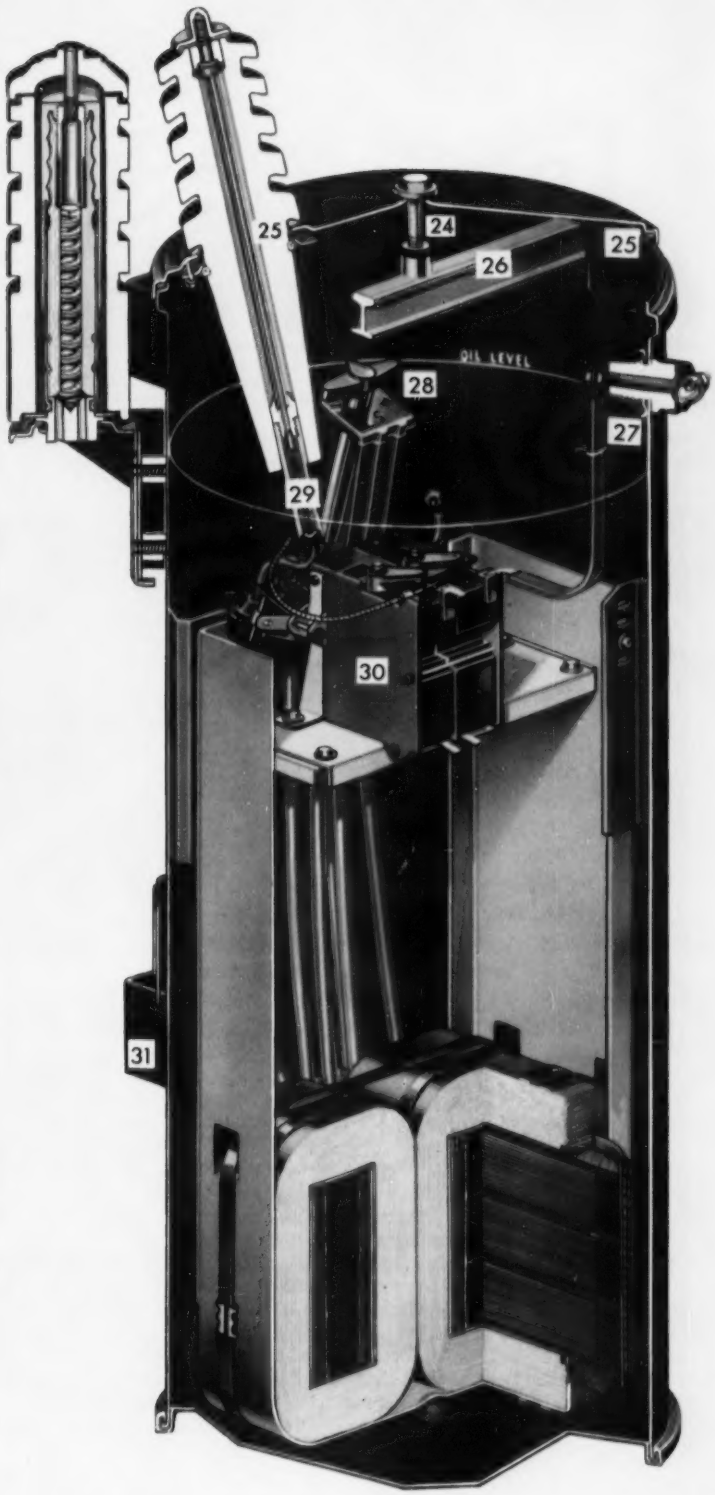
27. Low-Voltage Bushing (not threaded in Tank Wall)

28. Tap Changer with handle above oil level

29. Protective Link

30. Secondary Breaker

31. Hanger Lug



"National Safe Transit Committee" Approved!

Westinghouse pole-type transformers pass shipping and handling tests devised by the National Safe Transit Committee. These tests give assurance that Westinghouse transformers will arrive safely—under all normal shipping and handling conditions.

The Vibration Test, for instance, simulates actual vibration, shock, movement, pitch and toss of freight cars and motor trucks. One hour on this test is equivalent to shipping a transformer from Sharon, Pa., to Chicago. The Impact Test simulates dropping the transformer off a truck or shipping dock.

All Safe Transit Tests achieve validity through the sound basis of actual shipping experience, and the unqualified approval of both carrier and manufacturing representatives.

The Safe Transit Label, shown at right, approved for the first time on *any* transformer, is your evidence that Westinghouse is doing its part to see that built-in quality reaches you intact—ready for immediate installation.

For additional data on the new Westinghouse pole-type transformer line, call in your nearby Westinghouse representative or—if you prefer—write direct to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

1955
MODEL
DISTRIBUTION
TRANSFORMER
PRE-TESTED
SAFE TRANSIT
SHIPMENT
The manufacturer certifies that this PACKAGED PRODUCT meets the pre-shipment testing standards established by the National Safe Transit Committee and will withstand NORMAL transportation and handling hazards.
NATIONAL SAFE TRANSIT COMMITTEE
1346 Conn. Ave., N. W. Washington 6, D. C.
MAKE
SAFE HANDLING
YOUR JOB!

Bob Ray, Manager Distribution Transformer Sales, with one of the new pole-type transformers packed and ready for shipment. The Safe Transit Label is shown at upper right on shipping carton.

YOU CAN BE SURE...IF IT'S Westinghouse

B-6403
CP-1026

Printed in U.S.A.

Inspectors

Electrical Inspectors Assn. of B. C. heard a detailed report from L. E. Ryan, city electrician, of the discussion and decisions at a Part One code committee meeting of the Canadian National Code, held in Victoria earlier in the year. This was at the Sept. 20 meeting. Among topics of unusual interest discussed were these: duc-tube, a method of laying an inflatable tube in the concrete before the pour, which after the concrete has set is deflated and withdrawn, to make a clean raceway for electrical conductors. Discussion over this centered on whether wires and insulation would be subject to any chemical reaction in the cement. Use of combustible plastics for signs was discussed and hazard of overlamping was brought out. Polarized receptacles for use in elevators and the requirement that all portable electric tools be grounded also were lively topics. Likewise, use of nonmetallic sheathed cable provoked considerable debate as did the allowing of plug receptacles in bathrooms. Other topics included demand factors, circuit capacities for large ranges, high-voltage cables, etc. The Oct. 18 meeting was given a demonstration of light control by John H. Gilbreath, sales engineer, Holophane Co. Ltd.

WCEMA

Meetings of West Coast Electronic Manufacturers Assn. are held alternately in Los Angeles and San Mateo. At the Sept. 14 Los Angeles meeting Donald McLarnan, regional director, Small Business Administration, spoke. He also appeared at the Oct. 21 San Mateo meeting. Dr. A. M. Zarem, director, L. A. Division, Stanford Research Institute, spoke at San Mateo Sept. 23 meeting and Lt. Gen. Quesada, Lockheed Aircraft Corp. vice-president, at the Los Angeles Oct. 12 meeting.

WSEC

Opening salvo in a campaign to secure the approval of the Washington State Legislature to enact a bill "relating to installation of electrical wires and equipment; providing for the issuance of permits and licenses, and prescribing the powers and duties of certain officials in connection therewith" was set off at a meeting last month of the Washington State Electrical Council in Yakima. Approximately 25 representing the council, the Electric Club of Washington, chapters of NECA from Seattle, central Washington and eastern Washington, locals of the IBEW and Washington state PUDs were present.

C. D. Casey, Casey Electric Co., Seattle, and representing the Puget Sound Chapter, NECA, was re-elected president of the council formed last year to sponsor the proposed permit fee bill that failed to reach the floor. It was to have amended the state electrical inspection law to permit charging of fees for inspection rather than carry the cost of it entirely from contractors licenses. Dave Davis, Seattle Local 46, IBEW, was renamed secretary-treasurer. Regional vice-presidents elected were: D. D. Adams, electrical contractor, Spokane; Lacy Peoples, Cowlitz County PUD; Ben McLain, electrical contractor, Yakima. All legislative candidates were to be contacted personally to arouse interest in the planned legislation.

Officers of Northern California Chapter, International Association of Electrical Inspectors, M. Kennedy Bliss, secretary, Chester Hefner, chairman, Del Hanson, vice-chairman

Towner Buckley and William Major of Crouse-Hinds demonstrate what happens to an explosion caught in an explosion-proof lighting fixture to meeting of electrical inspectors

OEC & IES

Both Oregon Electric Club of Portland and the Oregon Section, IES, participated in a 12-block demonstration program to gain voter approval of a $10,000,000 street lighting proposition on the ballot at the Nov. 2 election. Six blocks of fluorescent and six of mercury street lighting, 39 units in all, were installed on Hawthorne Blvd. as part of the Junior Chamber of Commerce project for bettering Portland street illumination. The demonstration was done with flare. A parade of police and veterans bands drew a crowd of 500 spectators in the neighborhood shopping district. The ballot proposal calls for relighting of 1,140 miles of city streets, changing from present inadequate incandescent units to either the new fluorescent or mercury units. It is to be done on a 10-year program at a rate of a million a year. The present budget for street lighting is only $380,000.

SDEC

San Diego Electric Club heard R. T. Silberman, president of Kay Lab of that city, discuss "New Trends in Electronic Instruments," including demonstrations of a precision meter calibrator, electronic thermostat, etched and printed circuitry, etc., Oct. 25.

IES

British Columbia Section of the Illuminating Engineering Society started its new year with two papers on color, the first by Lionel A. J. Thomas, staff member, school of architects, University of B. C., and the second by Lloyd Hunt, color consultant of General Paint Corp. of Canada. New officers installed were T. H. Doherty chairman, J. Gilbreath vice-chairman and N. Kolbiens secretary. Executive members are J. Walker, D. McGregor and A. Cocking. Committee chairman for the Pacific Northwest Regional Conference, April 24-27 at Harrison Hot Springs, will be R. G. Scott. Lyman D. Morgan, Pittsburgh Reflector Co., Seattle, was the Oct. 21 speaker.

Oregon Section, IES, started off under new Chairman Frank M. Reis on Sept. 22 with a report on the national technical conference by Reis, M. S. Prestwood, vice-chairman, and D. W. Shirley, who attended. Merril R. Conner, Eoff Electric Co., spoke on the relation of radio interference with fluorescent lamps. The Oct. 15 meeting had R. R. Taylor Jr., Ace Electric Co., discuss the damage hazard in spectral energy and E. S. Smyth of Rohm & Haas Co., plastics department, San Francisco, on light control with Plexiglass.

Northern California Section, IES, had a ladies' night and Norman F. Barnes, manager, laboratory information services, G-E Schenectady, gave a popular presentation and demonstration of "Color Facts and Fantasies" on the Oct. 21 meeting. Max Lowenthal, retired inventor, who had worked with Edison, spoke briefly of his experiences with him.

Southern California Section under F. Edwin Blair, new chairman, plans a tour of CBS Television City in Hollywood Nov. 3. Gus Peterson, lighting superintendent and William Copeland, engineer in charge of color, will explain illumination as applied to color TV.

Committee for the South Pacific Coast Regional Technical Conference April 14-15, Statler Hotel, Los Angeles, will be headed by Jack Rohring, Southern California Edison Co. Vice-chairman is Merle Potter, attendance Jack Russell, budget Bill Shalda, entertainment Lloyd Reuscher, finance Jake Hochenauer, hotel Hugh Sheeter, ladies Mrs. Roy Kreyser, papers and program Roy Jones, publicity Del Reynolds, registration W. P. Bear, space and properties Charles Connely and transportation Benn Hartman.

San Diego Chapter held its Oct. 7 meeting at San Diego State College Little Theater at which Hunton D. Sellman, chairman of the speech arts department, author of books on scenery and lighting, discussed and demonstrated lighting techniques for the theater.

B.C. Section, IES, charter held by J. Gilbreath for T. H. Doherty and N. Kolbiens

IAEL

Two Western league managers were elected to office in the International Association of Electrical Leagues at its annual meeting Sept. 29 to Oct. 2 in Philadelphia. Glen L. Logan, Los Angeles Electric League, was elected secretary and James L. Schricker, Salt Lake City, IEA, chairman of Division IV. Norman Wicks, manager of the business development department of NEMA, was appointed corresponding secretary to succeed O. C. Small, who retired and was honored in a special tribute.

In reporting to the members of Northern California Electrical Bureau, LeRoy H. Bennett, who attended, declared he found major emphasis on wiring, wiring finance plans for modernization, industrial and commercial lighting, cleaning up of retail advertising to regain public confidence, and efforts to keep the appliance and TV wholesaler and retailer in business.

NISA

For National Industrial Service Assn.'s 1955 convention, General Chairman W. M. Hogue, Larsen-Hogue Electric Co., Los Angeles, has appointed George Larsen, Larsen-Hogue Electric Co., to head the program committee; Russell C. Lockard, Lockard Motor & Pump Co., Huntington Park, special events committee; William Pompey, Pompey Electric Motor Service, Pasadena, transportation; Joseph Walta, Littlejohn-Reuland Corp., Los Angeles, promotion; Lloyd J. Mokler, Zamboni Bros., Paramount, registration and information; Earle F. Sweinhart, Sweinhart Electric Co., Los Angeles, exhibits; William C. Hill, Hill Electric Co., Los Angeles, finance; the women's committee will be headed by Mrs. Hogue and Mrs. Sweinhart as co-chairmen.

PCEA Panorama

In the news this month is the technical subcommittee on highway lighting, which participated in the Governor's Traffic Safety Conference in Sacramento on Oct. 7 and 8. Three committee members, who were introduced by Committee Chairman G. A. Trosper, PG&E, made talks at the conference which was attended by 175 city and county engineers. Roy E. Dahlin, Southern California Edison Co., spoke on "Proven Incandescent Lighting Techniques." James H. Burson, Westinghouse, talked about "Latest Mercury Vapor Practices," and Leonard Towner, General Electric, about "Phases of Fluorescent Lighting."

After the meeting Chairman Trosper was asked to serve as a member of the Engineering Section's Steering Committee of the Governor's Safety Conference. He will attend five meetings of the group during the 1954-55 year as a representative of the PCEA technical subcommittee on highway lighting.

During the past year the steering committee of this division of the Governor's Safety Conference has concentrated on a program to develop uniformity in signs, signals and marking procedures throughout the state, and progress in this field was reported. The major effort this year will be toward establishing a common practice of assigning responsibility for traffic engineering to qualified personnel in all of the state's cities and counties. In addition, the Engineering Division will make continued efforts in unifying traffic devices and guiding the application of such features as standard safety lighting of streets and roadways. Through periodic meetings the steering committee will provide guidance toward the basic objective of the conference—the reduction of tragic driver and pedestrian accidents.

New Committee Chairmen

It has been announced that M. A. Hoff, Hotpoint Inc., Los Angeles, has been appointed chairman of the kitchen and laundry committee. Vice-chairman is H. G. Atwater, Leo J. Meyberg Co., San Francisco.

Tap the Line in Half the Time with SQUEEZON

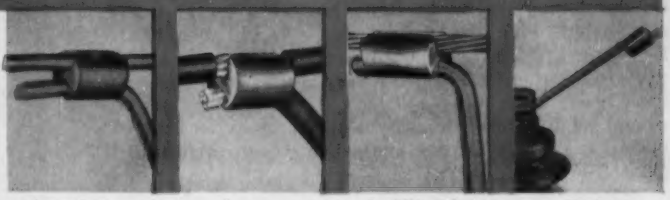
"ONE-CRIMP" CONNECTORS

The Fast, Low-Cost Way to Make Overhead Connections

One crimp . . . and you've got the connection!

That's all it takes when you make a line joint with a Squeezon and a Squeezon compression tool. You get a *better* connection . . . a perfect bonded, permanent joint. That's because Squeezon connectors provide *separate*, full-circumference grip on each conductor, eliminate galvanic corrosion on transfer surfaces.

Squeezon economy and all-around utility will please you. Your line crews can handle any job in half the time and at a fraction of the cost of conventional methods. One Squeezon tool and two types of connectors . . . the aluminum and the solid copper . . . meet all line requirements.

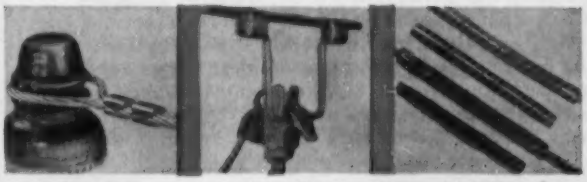


Copper Squeezon
One operation of the Squeezon compression tool permanently bonds this type of joint.

Aluminum Squeezon
Aluminum connector for aluminum conductor provides large area contact—prevents cold flow, for aluminum-to-copper or copper-to-aluminum. No special connector necessary.

For T Connections
Costly special connectors are eliminated by the use of Kearney Squeezon, for aluminum-to-copper connection.

Tap On
Squeezon's weld-grip high pressure bonding makes perfect aluminum-to-copper terminations.



Dead-Ends
One crimp per Squeezon saves time when multiple connectors are used.

Stirrup Tap
Two Squeezons and a short piece of wire make an inexpensive, easy-to-install stirrup, insures a rigid arc and corrosion-proof connection on hot lines.

Line Splice
Line splices are better electrically and mechanically with Squeezon sleeves.

The Squeezon Tool with controlled hydraulic pressure cold welds the connector to the conductor—tool hangs easily to conductor fully supporting its weight.

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THE MONTH IN BRIEF

Facilities Dedicated in Jubilee

Observing Light's Diamond Jubilee, three California power companies dedicated new facilities last month. On Oct. 19 Southern California Edison Co. dedicated Lake Thomas A. Edison, formed by Vermilion Dam, most recent addition to its Big Creek-San Joaquin hydro project. On the same day San Diego Gas & Electric Co. dedicated the 100,000-kw first unit of its Encina steam plant near Carlsbad, Calif., and reported it will be in full operation by Nov. 15. Pacific Gas and Electric Co. on Oct. 20 put two units at Pittsburg on the line. (See p 144.)

Hells Canyon Decision Delayed

Final FPC decision on Hells Canyon, which was made a campaign issue in Idaho, may not come until spring. FPC says engineering analysis on conflicting proposals for developing the Snake River has taken longer than anticipated. First briefs were due Oct. 11 but FPC Examiner William Costello granted the FPC staff a 30-day extension until Nov. 10. After Costello has reviewed these briefs, each party will have a chance to submit a second rebuttal brief. Idaho Power Co., as applicant for license to develop the site, may then submit final argument.

Phoenix Votes Franchise

In a city election Oct. 5 Phoenix voted 3,877 to 274 to give Arizona Public Service Co. a new 25-year franchise that will net the city about $10,000 a month. The new franchise tax is 2% of the company's city gross; the tax formerly was 2/100th of 1% of city gross. In addition the company must (1) pay all general city taxes and may not deduct them from its franchise payment unless the city levies a specific tax against utilities; (2) give the city notice before seeking a rate increase and open its books for city examination. The city (1) must give the company advance notice if it requires lower electric rates; (2) may take over the company's plant and lines by paying their fair value.

PUD Rejects Purchase Offer

Commissioners of Stevens County, Wash., PUD have turned down Washington Water Power Co.'s offer to buy out the district for more than $2,000,000. WWP President Kinsey M. Robinson said the company hoped to buy the PUD properties to avoid possibility of conflict when its new $4,300,000 transmission line is built between Spokane and the Waneta, B. C., power plant of Cominco. The line probably will cross Stevens County. PUD commissioners say that they will continue legal action to acquire WWP distribution in the county.

New Bidding Formula

New bidding formula on contracts for heavy electrical equipment for federal projects was used for the first time in evaluating bids on generators for The Dalles power house, with U. S. manufacturers outscoring foreign competition. The old price escalation clause in government contracts has been dropped. Price adjustments instead are tied to independent Labor Department cost indexes for labor and materials. Since most foreign bids were firm, addition of the escalation to American bids just about wiped out the 25% preferential price differential granted under Buy American regulations. Under the new system, the base American bids will be compared with base foreign bids. Final price will be higher or lower than contract price depending upon the fluctuation in the Labor Department indexes. The new formula was worked out jointly by the Corps of Engineers and Bureau of Reclamation in consultation with the heavy electrical equipment industry.

Survey Group Proposed

Gov. Arthur B. Langlie of Washington, who previously has voiced his conviction that the proposed Priest Rapids hydroelectric dam on the Columbia River should be built by the State Power Commission, now is willing to have an "impartial group" decide who should build the project. His only concern, he told a meeting last month, is that the dam is properly built by an agency capable of coping with the $400,000,000 problem. He was speaking in territory served by the Grant County PUD, which has secured an order enjoining the commission from proceeding with plans to build the dam. The survey group should include representatives of the power industry, engineering and bonding firms, and the federal government, Langlie said.

Peacetime Nuclear Power

Formation of a Rocky Mountain group to study peacetime development, application and utilization of nuclear power was announced last month by George M. Gadsby, Utah Power & Light Co., chairman of the group's management committee. The group, which has been authorized by AEC, includes Arizona Public Service, Idaho Power, Public Service of Colorado, Utah Power & Light, Ebasco Services, Fluor Corp., Minnesota Mining & Mfg. Co., Phillips Petroleum Co., Riley Stoker Corp. Expenses will be borne by member companies and each will contribute manpower equivalent to one full-time employee. Headquarters will be in Idaho Falls.

Specialists to Study Project

Authority to retain five technical specialists to study a proposed hydroelectric project on the Pend Oreille River near the Canadian border in northwestern Washington has been granted by the Seattle Board of Public Works to Paul J. Raver, City Light superintendent.

Harvey Plant in News

Harvey Machine Co.'s aluminum smelting subsidiary and its announced plans for a $65,000,000 project at The Dalles, Ore., was back in the news, with a move by the Chamber of Commerce to push for electrical service ties and a firm contract for Bonneville power (EWEST, August, p 114). Status of the plant figured in the Oregon political campaigns where federal power policy was an issue.

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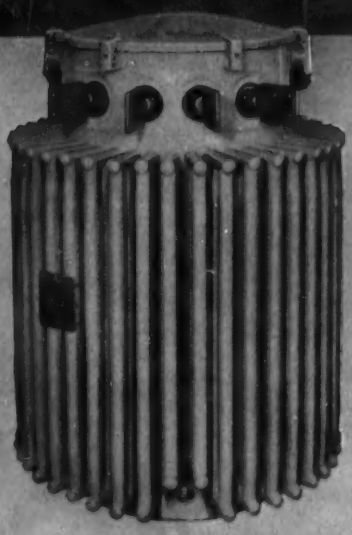

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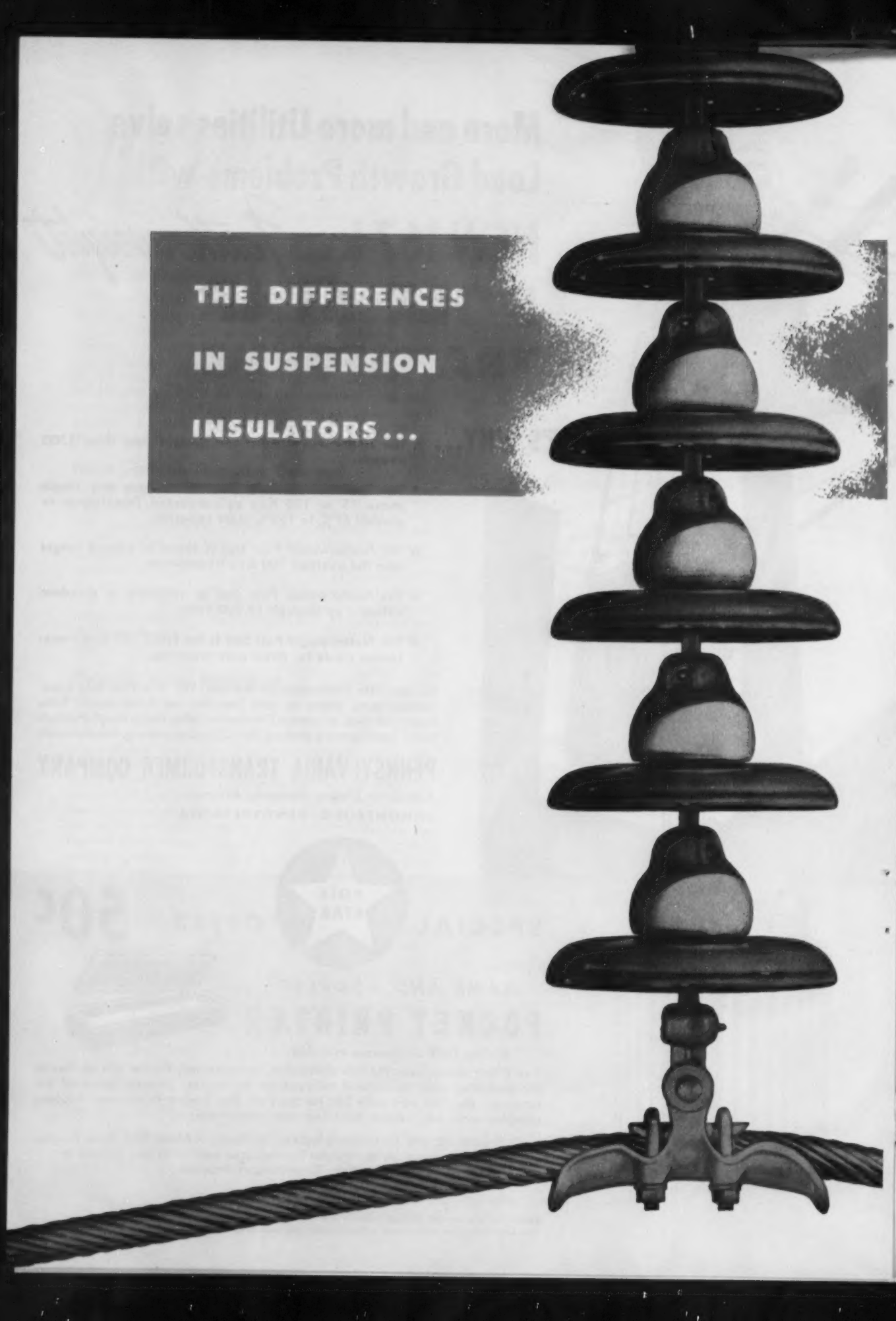

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THIS MONTH'S NEWS

Farm Electric Use Pushed In Cooperative Program

In a cooperative program to expand use of electric power on farms, representatives of all branches of the industry in the Western states met in Denver. Sponsored by the Inter-Industry Farm Electric Utilization Council, the meeting was one of five throughout the United States (EWEST, September, p 136). Arrangements were made through the REA.

Among the more than 400 attending were representatives of rural electric co-ops, electric companies, manufacturers and distributors of farm equipment and appliances, wiring contractors, farm group and agricultural extension services. State plans:

California-Nevada—Plans for stepping up farm use of electric power can be worked into existing promotional activities, it was reported. E. G. Stahl, San Francisco, representing the electric companies, was spokesman.

Colorado—A steering committee to set up a state-wide promotional campaign was formed. Members are W. L. Duncan, Denver, representing manufacturers, suppliers, distributors; Arthur E. Gaines, Hugo, representing co-ops; P. E. Brookover, Denver, companies; O. J. Trenary, Extension.

Idaho—William H. Knight, University of Idaho; Robert Hogg, Boise, representing electric companies; P. E. Shane, Malta, co-ops, are arranging a state meeting.

Montana—A committee of three to arrange a state planning meeting includes: Max Mathews, Huntley, for co-ops; D. J. McGonigle, Butte, companies; Eric Wilson, Extension.

Utah—A state meeting will be held and the steering committee includes: W. A. Huckins, Salt Lake City, electric companies; Reed Burr, Richfield, co-ops; S. H. Daines, Extension.

Washington-Oregon-Alaska — Pacific Northwest representatives met as a single group at Denver and will decide later whether to work as a single area or separate territorial units. Robert B. Smith, Spokane, representing co-ops, reported for the group.

Wyoming—Agreeing on an appliance survey in the state, the group selected the following steering committee: W. B. Petch, Cheyenne, electric companies; Richard C. Anderson, Aurora, Colo., manufacturers; Kermit R. Brown, Casper, distributors; W. T. Kirk, Extension; V. E. Estep, co-ops.

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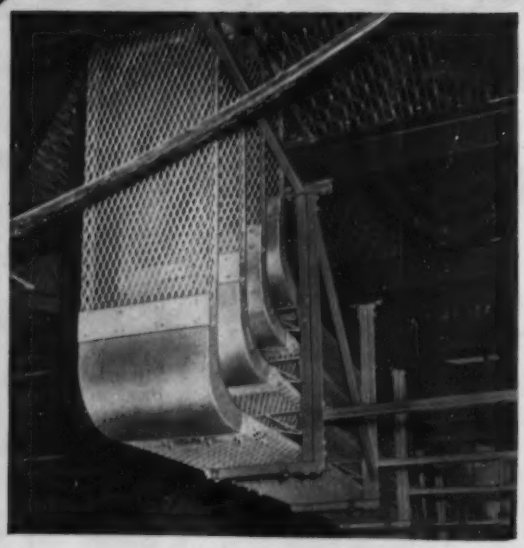

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EISENHOWER AIDE SPEAKS ON PARTNERSHIP POLICY

A principal reason behind the administration's partnership policy in the construction of new generating facilities is the belief that hydroelectric development of the Columbia River is too big a program to be carried out by the federal government alone, the Pacific Northwest Trade Assn. was told at Wenatchee, Wash., by Sherman Adams, assistant to President Eisenhower.

"If you here in the Northwest wait for tax dollars to be collected from citizens all over the United States and to be appropriated by Congress, much of the work you want done will not get done, either on the scale you want or in the way you want," Adams said.

There are now on file with the FPC 14 applications from local groups which propose water power development on the Columbia and its tributaries. These proposals together with the John Day project—half of which private interests have offered to pay—represent almost 4,000,000 kw.

"Conservation, development, diversification — these are the three key words with which you can mold the future to your will. The only way you can achieve all three is through cooperation every step of the way between public agencies and private initiative."

Adams pointed out that the federal government intends to do its share in development of the Columbia, however.

"The federal government has invested about 1½ billion dollars in Pacific Northwest projects and is committed to investing another one billion dollars to complete projects now under construction," he pointed out. "The people of your region can be assured that the federal government will continue active participation in the development of the Columbia River and its tributaries."

Two-thirds of the 34,000,000-kw power potential of the Columbia River system remains to be developed, Adams said.

• **Maui Electric** Co.'s offer to buy the Lanai City electricity distribution system has been accepted by Hawaiian Pineapple Co., subject to PUC approval. Under the plan, Hapco will generate electricity at its Lanai City power house and sell it to Maui Electric for distribution and sale in Lanai. Hapco will buy electricity from Maui for its shops, offices and hospital.

• **Negotiations** for purchase of Lahaina Light & Power by Maui Electric have ended, since terms could not be arranged.

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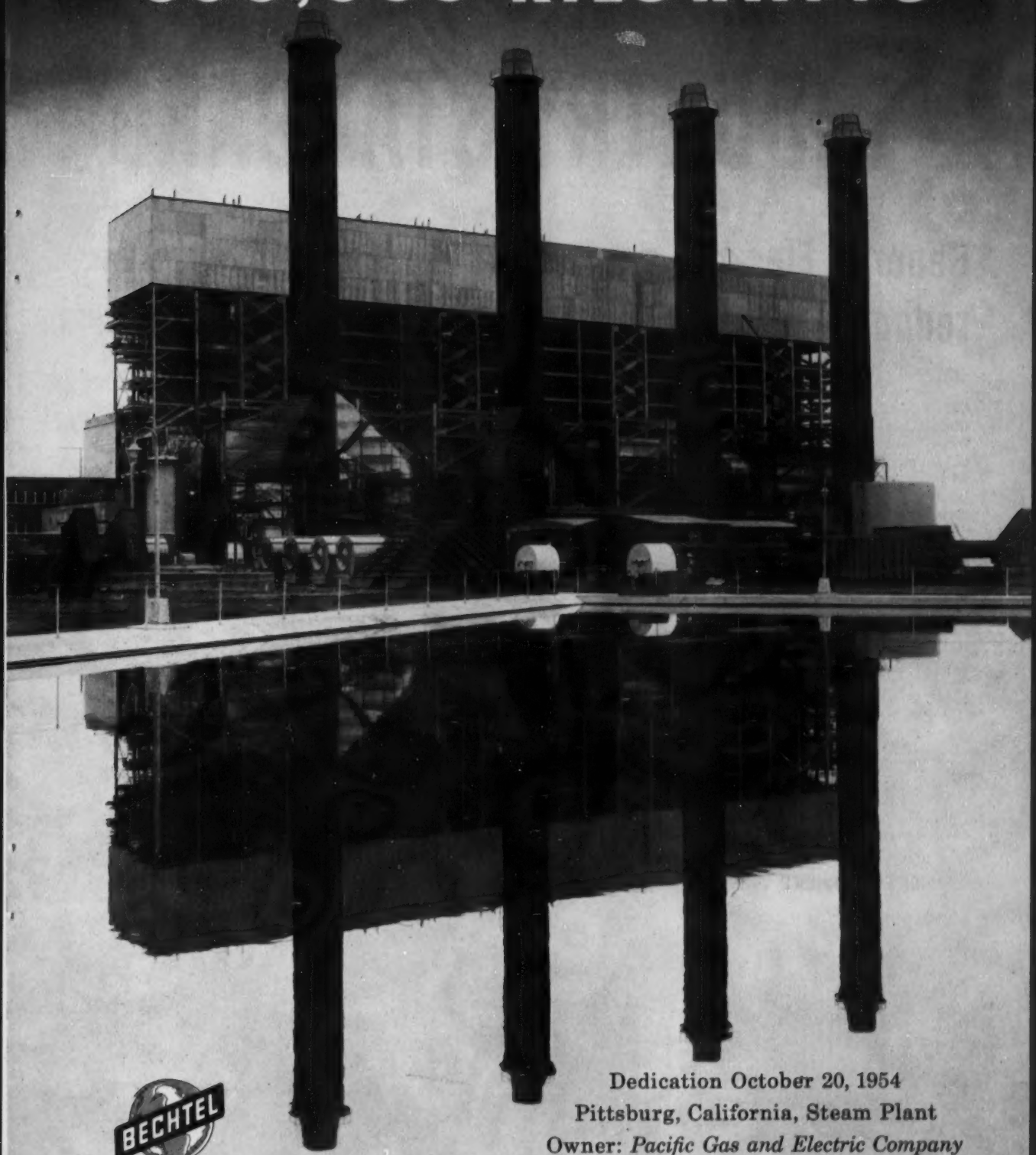

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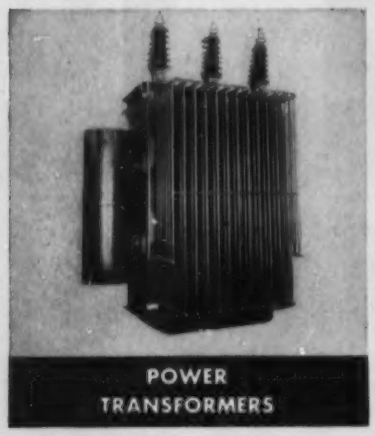

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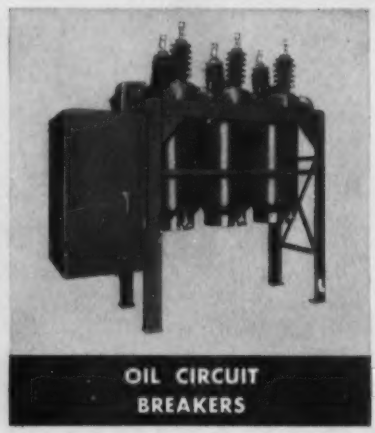

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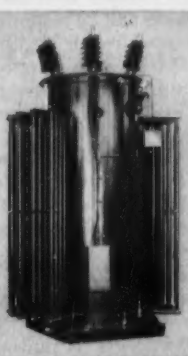

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AGREEMENT REACHED IN COLUMBIA COMPACT

Seven Pacific Northwest states and the federal government have reached final agreement on dividing and using Columbia River waters through the year 2000 under terms of the Columbia Interstate compact.

The Columbia Interstate Compact Commission was to meet in Portland Nov. 11 to review the compact before submitting it to state legislatures in January. The final draft compact represents more than two years of work by commission members from Washington, Oregon, Montana, Wyoming, Utah, Idaho and Nevada.

The commission regards the permanent compact commission as a recommendatory agency to consider all projects in the Columbia Basin and to advise the member states, the federal government or Congress.

The permanent commission, under terms of the compact, would be required to make a recommendation to Congress, on power reservations and water uses connected with any federal project begun after the compact is ratified. The commission could find, however, that a recommendation would be impractical on a federally licensed project, that is, a private or nonfederal public project.

Calvert Anderson, commission secretary, said the legal and drafting committees would meet in Spokane for a final discussion of the compact language before the Portland session, the commission's last of the year. Chairman of the legal committee is R. P. Parry of Twin Falls, Idaho, and chairman of the drafting committee, Lloyd I. Wallace of Polson, Mont.

The commission membership agreed at a recent Spokane meeting on the two final knotty problems of writing the document: water apportionment and power reservations.

The compact will provide that the permanent commission will be responsible for reviewing any project begun in the Columbia Basin and recommending that the total "at site" power be reserved to the state in which the project is located.

The commission will also consider the downstream benefits of the project, and recommend a reservation of power for the state amounting to a "fair and equitable share," in the language of the compact.

Should a state use enough Columbia or tributary water in irrigation to reduce the river flow, then its power apportionment would be reduced in proportion. For purposes of evaluating river flow, the commission will use 1948 as a standard, since the

Bureau of Reclamation completed a thorough depletion study that year.

Upstream areas of the basin would be given unrestricted right to beneficial (irrigation, navigation, etc.) uses of river water until the year 2000. This clause guarantees irrigation development until 2000, commission members explained. For a dividing line, they chose the summit of the Cascade Mountains, so that Washington and Oregon lying east of the summit, and Idaho, Montana, Nevada, Utah and Wyoming would be considered upstream areas.

Parenthetically, Secretary Anderson points out that the Columbia Basin Interagency Commission has forecast no water shortage on the Columbia for any purpose before 2008.

At the year 2000, the Compact Commission can extend the provisions of the compact, but not beyond the year 2050, or it can undertake the task of apportioning water among the member states if that seems advisable.

With the final draft compact virtually completed, the compact commission now proposes to prepare model bills for the seven state legislatures concerned, and draft proposed enabling legislation for Congress.

Cooperative Decides to Continue Operation

Pend Oreille Electric Cooperative has voted to continue independent operation rather than to consolidate with neighboring utilities or to sell out.

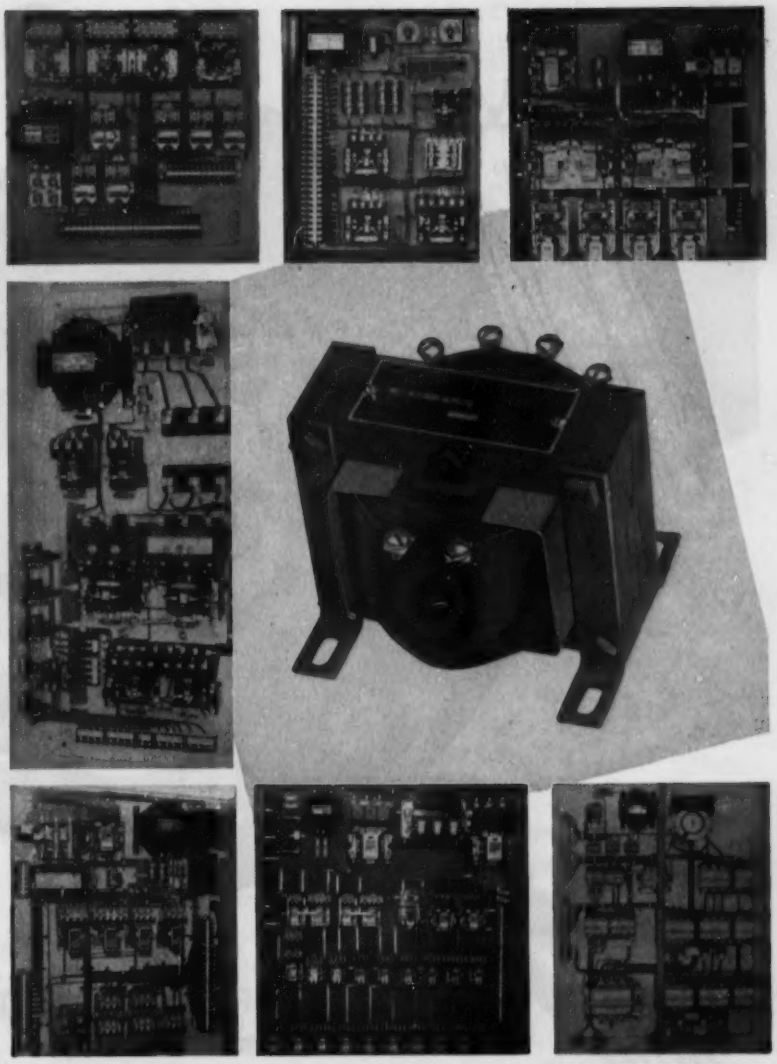
About half its customers had voted, in a postcard election, for service by Washington Water Power Co., if the co-op sold its properties. However, 200 members and their families, holding proxies for 250 others, voted not to sell the cooperative on advice of the retiring directors, who said it "could and should continue to operate."

Arizona Company Seeks Recovery on Taxes

A suit seeking recovery of $20,118 claimed erroneously collected in federal taxes, has been filed in U. S. District Court at Phoenix, Ariz., by the Arizona Power Co.

The company was formed in a merger of Prescott and Flagstaff utility firms which later became part of Arizona Public Service Co.

The payments in dispute were made upon deficiency assessments when the government claimed certain funds were wrongfully distributed as dividends, accounted for in 1947 returns.



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Next Steps in Atomic Progress . . . A Challenge to American Industry

The purpose of this editorial is to throw light on the significance for American industry of recent changes in the statutes that control the development of atomic energy.

The need for clear light on the meaning of this new legislation is made more urgent by the political confusion and distortion that marked its course through Congress. The politically inspired charges of "giveaway" that delayed its passage — charges that were almost totally unrelated to the legislation itself — helped to obscure the vital importance of the step finally taken by Congress.

In sober, post-Congressional fact, the principal significance of the new atomic legislation is that it extends to private enterprise responsibility for the development of peaceful uses of atomic energy, whereas heretofore this responsibility has rested in a tight government monopoly. **And this extension is made on terms that emphasize the responsibility far more than they open any opportunity for economic gain in fulfilling it.** The revised Atomic Energy Act provides that:

1. Industry may now own and operate its own nuclear reactors, under license from the Atomic Energy Commission. And it may build and sell nuclear reactors for export.

2. Industry may use — but not own — nuclear materials at the discretion of the Atomic Energy Commission.

3. The Atomic Energy Commission will make available to industry scientific knowledge that may be useful in developing peaceful applications of nuclear energy.

4. For the first time, industry will have the right to patent inventions in the field of nonmilitary nuclear energy. However, "basic" discoveries must be made available to all companies in the field for a period of five years, after which they, too, will revert to normal patent status.

Two Kinds of Know-How

These provisions, despite the imposed limitations, represent the first positive step toward development of nuclear energy for peaceful applications in the United States. Potentially useful knowledge, previously locked in the minds of government scientists, will now be available to all those who are willing and able to put it to work for the good of mankind.

The advantages to be gained from enlisting the talents of American industry in the development of peaceful atomic applications are imposing. As *The* (London) *Economist*, Europe's leading economic journal, recently remarked, "The atomic scientists are in a position to surmise how atomic energy can be applied... but they lack the specialized knowledge of engineering design and operating technique just as industry itself lacks atomic knowledge." Now the engineers of private industry need no longer lack the atomic knowledge, and there is granted to them at least a restricted freedom to apply it to the solution of their engineering and operating problems.

But the new opportunity for private industry to find constructive uses for the science of nucleonics carries with it a grave responsibility. These uses must be so developed that they will benefit the people of all the free nations. It is essential that the United States, which pioneered in developing lethal uses for atomic fission, demonstrate to the world our paramount interest in its peaceful application. It would be a moral set-back to the free world almost beyond calculation if the Communists should be able to offer to the poorer nations of the world the benefit of low cost atomic power—provided by Communist technicians—while we concentrate primarily on building our stockpile of atomic and hydrogen bombs.

Race For a Peaceful Victory

Most of the experts are agreed that it may be many years—perhaps ten, fifteen or more—before the cost of electricity from atomic fission can be reduced to a level that will make it competitive with conventionally produced power in most regions of the United States. But most of the world is not nearly so fortunate as we are in power resources. Electricity, even at a cost far higher than the average that prevails in the United States, would be a blessing in many countries, and the nation that provides the technology to bring it into being will score a great moral victory.

The useful potential of nuclear energy is not restricted to the generation of electric power—although twenty years from now this use will be highly important to the power industry of the United States. Even with the limited research that has been done in this field thus far, the use of radioisotopes—the radioactive products of atomic reactors—is saving American industry an estimated $100 million a year. Commissioner Campbell of the AEC, who made this estimate, believes that these savings may well reach $1 billion a year within ten years. Radioisotopes are already at work in industries ranging all the way from paper manufacturing, where they measure paper thickness, to pipeline transportation, where they mark the dividing lines between shipments of different products (at an estimated saving of $500,000 a year). Medical applications of these same radioisotopes hold promise of longer and more comfortable lives for those who are stricken by cancer and other diseases.

Above All a Challenge

The new Atomic Energy Act is a crucial stride toward the day when all these benefits—and undoubtedly others not yet revealed by research—will be realized. But it is a step that is essentially permissive. It still leaves it to private industry for the most part to decide what is to be done and how soon.

The new act is thus, above all, a challenge. It confers on private industry the responsibility to assume a leading role in the development of peaceful uses for nuclear energy, a step long urged by NUCLEONICS, a McGraw-Hill magazine devoted to atomic energy. To achieve a success in this task that will measure up to the requirement of the national interest, this development must command all the resources and ingenuity that private enterprise can apply—and do so without promise of glittering prizes surely to be won. **But now that the responsibility has been defined and the challenge offered, American industry will, we believe, measure up to its grave and mighty import.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Again Hotpoint *looks at Tomorrow, Today*

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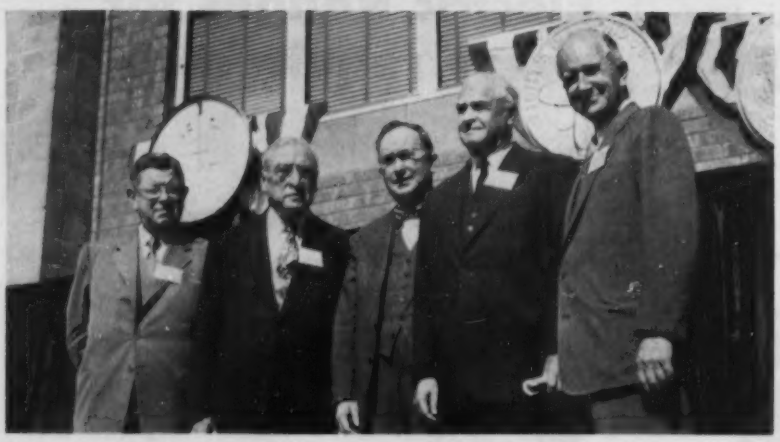

WORLD'S LARGEST incandescent lamp was lighted as PG and E officially started operation of its $75,000,000 Pittsburg steam plant. Above, taking part in the dedication ceremony Oct. 20 are: Norman R. Sutherland, PG and E vice-president and general manager; Joseph R. Knowland, publisher, Oakland Tribune; Peter E. Mitchell, president, California Public Utilities Commission; PG and E President James B. Black; Stephen D. Bechtel, president, Bechtel Corp. Some 500 witnessed the ceremony, toured the plant

PG and E Dedicates Pittsburg Plant

Planned as part of the nation-wide celebration of Light's Diamond Jubilee, dedication of Pacific Gas and Electric Co.'s Pittsburg steam plant on Oct. 20 was attended by more than 500 persons.

Largest in the PG and E system, the $75,000,000 plant was designed to add 600,000 kw when all four units are operating. It was pointed out, however, that preliminary tests of the first two units indicate that each is developing 165,000 kw instead of the assigned rating of 150,000 kw.

Presenting the plant to the company, Stephen D. Bechtel, president of Bechtel Corp., constructor, pointed to the teamwork necessary in designing and building such a project, most modern of its kind and largest steam electric plant in the West.

Pointing out that money for construction was obtained in the market from thrifty citizens who made a free choice in the investment, PG and E President Black declared: "That is the pattern of financing that has built American industry, under our incentive system, to a pre-eminence not approached by any other anywhere in the world. These are plain facts of life which refute socialistic dreams."

Peter E. Mitchell, president of the California Public Utilities Commission, pointed to the enterprise, vision and courage needed to build such a plant; said that present plans of California private utilities call for $215,000,000 in steam plant expansion. To keep pace with California's growth, it will be necessary to add both steam and hydro in the future, he said.

Publisher Joseph R. Knowland closed the switch to start operation of the first two units. As he did so the 75,000-w lamp developed by G-E for the Diamond Jubilee was illuminated.

William H. Park, manager East Bay division, was chairman. Norman R. Sutherland, vice-president and general manager, gave the welcome.

LAKE THOMAS A. EDISON DEDICATED FOR JUBILEE

Lake Thomas A. Edison, formed by completion of Vermilion Dam, most recent addition to its Big Basin-San Joaquin River hydro project, was dedicated by Southern California Edison Co. on Oct. 19. Held in the High Sierra, the dedication observed Light's Diamond Jubilee.

Use of additional water from the 125,000-acre-ft lake will add an average of 122,000,000 kwh annually to output of the company's six existing Big Creek power houses. During exceptionally dry years, production can be increased as much as 440,000,000 kwh by reserve water stored in the lake, it was pointed out.

Construction of Vermilion Dam, started in May 1953, was completed in two seasons, limited to seven months because of heavy winter snows.

In his dedication address, Edison President Harold A. Quinton pointed out that Big Creek was one of the first multiservice developments built, dating back to 1913, and served as a pioneer project for many of the industry's most important developments. "It was here that electric energy for the first time was transmitted over long distances at the previously unheard of voltage of 150,000 v . . . It was here, too, that transmission of electric power at 220,000 v was first used in 1923."

L. R. Quinby, manager of the San Joaquin Valley Division, was master of ceremonies and W. L. Chadwick, vice-president and head of engineering activities, was a speaker.

Last month also saw the completion of another Southern California Edison facility—the new plant No. 2 at Redondo Beach steam station. The 156,000-kw unit was put in commercial operation early in October.

Encina Dedication Is San Diego's Observance

San Diego Gas & Electric Co.'s Encina steam plant near Carlsbad was dedicated Oct. 19 as the company's Diamond Jubilee observance. The plant when completed will cost $60,000,000 or more.

President E. D. Sherwin reported that the $18,000,000 first unit would be in full operation by Nov. 15. In his brief dedication address, he said the new installation represents a 30% increase in system generating capacity.

The second unit, to cost $16,000,000, is on order and is expected to be in place by the fall of 1956. Third and fourth units are planned at two-year intervals.

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SERVICE CENTER—Contract for this modern center for Southern Nevada Power Co. has been let to Tiberti Construction Co. for an initial cost of about $115,000. One phase of the company's $6,500,000 expansion program, the center will be operating headquarters for construction and maintenance crews. The main building will include electrical and mechanical shops, garage, storeroom and warehouse and carport for line trucks. In a smaller building will be offices for the line superintendent and assignment offices for foremen, a meter shop, relay testing and radio repair shop, lockers and showers. There will be a storage area for crossarms, wire and transformers and a shed for smaller equipment. An area across the railroad tracks will be used as a pole yard. Dispatching will be by radio telephone through the base radio station, to be located in front of the switching station, shown in the drawing. The two-way radio telephone system will eliminate delay on service calls. The entire service center area will be landscaped

Douglas PUD Tells Plans For Columbia Development

Douglas County PUD of Bridgeport, Wash., expects to follow Corps of Engineers' plans in its $250,000,000 development of the Columbia River at the Wells site, for which it has received a preliminary permit from the FPC.

The project would have a total installed capacity of 588,000 kw, at 56-ft head, with twelve 49,000-kw generators in a power house 1,265 ft long on the west bank of the river, near Azwell. Locks may be installed in connection with the dam, in the event they are installed in the proposed Priest Rapids Dam downstream and also in Puget Sound Power & Light Co.'s Rock Island Dam.

The Columbia River would be diverted in two stages during construction of the dam, first over the excavated west bank after a cofferdam has been built to enclose the spillway section in the river bed. The dam would create a reservoir 29 miles long, which would flood part of the town of Pateros unless dikes are built. The reservoir also would require relocation of seven miles of railroad line and eight miles of highway, as well as the alteration of several bridges.

The dam will be about 100 ft high and 3,300 ft long.

• **Chugach Electric Assn.** of Anchorage, Alaska, will ask FPC for a preliminary permit to build a hydro project on the Kenai Peninsula at Cooper Lake. One plan, costing about $6,634,000 and developing 12,000 kw, calls for a 5,200-ft tunnel to Kenai Lake. Another, costing $7,200,000 and developing 15,000 kw, would carry water from the lake around the mountain down to a penstock and into the proposed power plant.

• **A $750,000 central office** building is in the planning stage by Salt River Valley Water Users and Power District at Phoenix, Ariz. Kemper Goodwin, Tempe architect, has been retained to prepare the plans, Vic Corbell, power district president, said. Favored site for the new building is between the cities of Phoenix and Tempe. The power district operates a steam generating plant nearby and the site affords ample parking and equipment storage facilities.

• **Coos-Curry Electric** Cooperative Inc. of Coquille, Ore., has filed application for a preliminary FPC permit to build a $28,000,000 hydro project on the Illinois River at the Bald Mountain site. Plans call for a 140,000-kw plant with average output of 43,200 kw.

• **City of Seattle** has asked FPC for an amendment to its license to add a fourth 90,000-kw generator at its Ross plant on the Skagit River. As originally constructed the plant contained three units and provided space for a fourth. Cost of the addition is estimated at $5,333,900.

• **A $114.007 contract** for construction of 129.3 miles of line for the Big Flat Electric Co-op in Phillips County, Mont., has been awarded to Rosebud Construction Co. of Minot, N.D.

Hilo Electric Building New Steam Plant

Additional generation required by the Hilo Electric Co. of Hilo, Hawaii, is to be provided by the new steam-electric station to cost $1,750,000. An 80,000 lb-hr B & W steam generator using bunker C oil will supply steam to a 7,000-kv General Electric turbine-generator at throttle conditions of 600 psi and 825 F. Construction is to start this month with completion scheduled for November 1955. The Bechtel Corp. is designer and contractor.

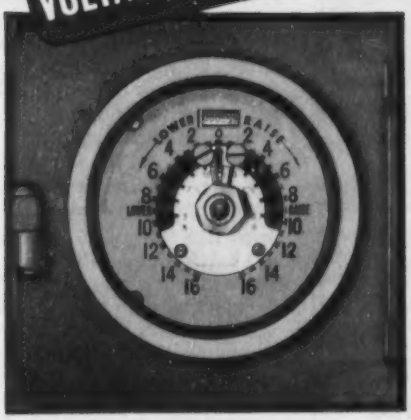
Power From Eklutna to Be Available in December

Power from the Bureau of Reclamation's Eklutna hydroelectric project near Anchorage, Alaska, will not be available until Dec. 1, according to L. F. Wiley, construction engineer. First power output originally was scheduled for Nov. 15.

Installation of the first generator on the $33 million project still is under way and the second generator arrived only Oct. 6 from Switzerland.

• **B. C. Power Commission** is erecting a two-story office and administration building on Seymour St. in Kamloops, B. C.

• **Montana Power** Co. has applied to FPC for authority to import natural gas from Alberta, Canada, to supplement supplies available to its pipeline system.



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COMPANY FILES AMENDED LICENSE ON PIT RIVER

Pacific Gas and Electric Co. has filed amended applications with FPC for licenses for two new power houses on the Pit River. The plants would develop 164,000 kw of power.

The applications revise designs for Pit 6 and Pit 7 power houses to make use of McCloud River water, which would flow into the Pit upon construction of the McCloud-Pit project announced by the company last February.

PG and E is now building Pit 4 power house, which will be in service next year and will develop 84,000 kw. With all existing and proposed plants in service, the company's generating capacity on the two rivers and their tributaries would total 776,000 kw.

Seattle Awards Contract For Fourth Ross Unit

After receiving bids on three different occasions, the Seattle Board of Public Works finally has been able to award a contract for manufacturing and installing the fourth 90,000-kva transformer in City Light's Ross power house on the Skagit River.

The award, for $1,375,000, went to Westinghouse Electric Corp., with delivery promised by January 1955. American-Elin Corp. figured low at $1,138,870 but did not fulfill specified requirements on delivery time and excitation equipment.

Bids received on two previous occasions were rejected as too high or failing to conform to specifications.

• **Utah Power and Light Co.** awarded its 1954 four-year college scholarships to one Idaho and two Utah students whose fathers are employed by the company. Utah winners were **Dee Passey,** son of George I. Passey of Salt Lake City, and **Garth Johnson,** son of Samuel H. Johnson of Smithfield. Idaho recipient was **W. Reid Dunbar,** son of W. E. Dunbar of Preston. The scholarships, offered annually since 1941, are worth $600 annually for each student. Grants are limited to children of Utah Power and Light Co. employees who wish to study engineering. After college, each recipient is offered a job with the company.

• **Hawaiian Electric Co.** has offered holders of its common stock 50,000 shares for subscription at the rate of one new share for each 13 shares held. Subscription price is $20 a share. Public Utilities Commission and stockholders approved the offering.

PGE LETS CONTRACT FOR SERVICE CENTER

Portland General Electric Co. has awarded a contract for $1,010,310 for construction of buildings and expansion of present warehouse structure for a service center at S. E. 17th Ave. and Center St. in Portland. Award was low bid of Henry M. Mason Co. and completion is planned for July-August 1955.

The facility, utilizing a two-story and basement warehouse located on a six-acre tract, will bring together a number of departments. Company officials figure savings of $100,000 annually from the center.

The warehouse will have an annex built for transformer shop and a covered loading dock constructed the length of the 80x220-ft building and capable of handling 26 line trucks. The warehouse itself will be modified to increase storage space. The new line department building will be built to allow addition of three stories in the future.

Bids Received by Army on The Dalles Generators

General Electric was low on both alternate offers for generator units of The Dalles Dam power house on the Columbia River, when bids of six companies were opened by the Corps of Engineers, Portland. Bid for eight 82,105-kva units was $11,114,620 and for four, $5,613,284.

Col. James U. Moorhead, district engineer, said the corps will decide whether contracts on eight or four units will result in a lower unit price. Initial generation is scheduled for November 1957 and the eight unit bid offers delivery of all eight by May 1, 1959.

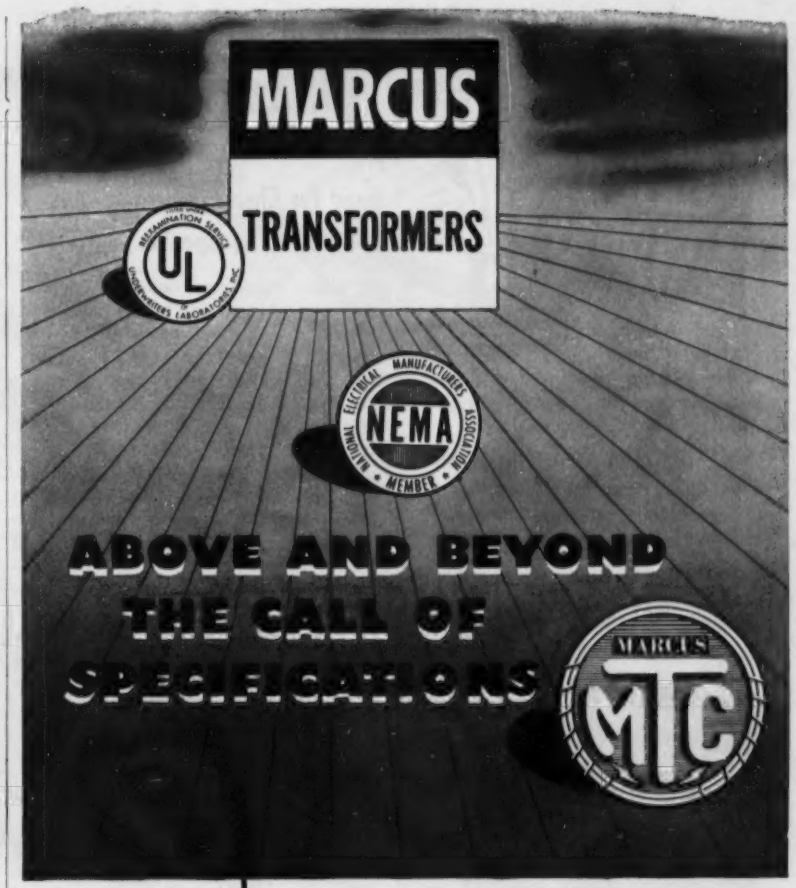
Alcan Will Expand Its Kitimat-Kemano Operation

Aluminum Co. of Canada has announced a $45,000,000 expansion at Kitimat-Kemano to hike aluminum ingot production in British Columbia by 65%.

Installation of fourth 105,000-kw generator at Kemano and expansion of Kitimat potlines is scheduled for completion by late 1956.

Canadian General Electric will build the generator; Dominion Engineering will install the turbine.

Kitimat went into production early in September. (See p 75.) Annual aluminum production with the presently installed 315,000 kw is 91,500 short tons.



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NOTES ON THE TRADE

Need for Cheap Hydro Pointed Up by Speaker

"Little cheap hydroelectric power is now available in reach of civilization, we will have to look to out-of-the-way places," Frank L. Magee, vice-president and general production manager for Aluminum Co. of America, said while in Portland last month to open the company's new extrusion plant at nearby Vancouver, Wash.

"I'm out here mainly to try to firm up our present power supply and to investigate means of obtaining additional power at economic rates," he continued. "Alcoa stands ready to invest its own money in any project for the production of electric power at economic rates. We are interested in any form of partnership deal. We would be interested in building our own dam if that could be done economically."

The company has about $200,000,000 invested in plants in the region, according to D. Wilmot, vice-president in charge of sales.

Magee reported Alcoa is still looking at the Dyea site near Skagway, Alaska, although the Canadian government has awarded Frobisher interests exclusive franchise to develop the water power on the Canadian side of the Alaska panhandle.

Other company officials at the opening of the mill included C. S. Thayer, northwest operations manager; R. T. Whitzel, general manager of the smelting division; J. P. Haight, general manager of the fabricating division.

• **Fluorescent Fixtures of California** has started construction of a new plant and office in South San Francisco, to be completed about Dec. 15. The building will provide 66,000 sq ft of working area, and its 107,000-sq-ft lot provides for future expansion. Only 10 years old, the company has moved four times to accommodate growth. The firm also has plants in Los Angeles and Portland.

• **Westinghouse Electric Supply Co.** will open a new office and warehouse in San Jose, Calif., Jan. 1. **Edward B. Taggard** will head the branch, which will serve Santa Clara, Santa Cruz, Monterey and San Benito Counties. A 10,000-sq-ft structure to serve as office building and warehouse is now under construction.

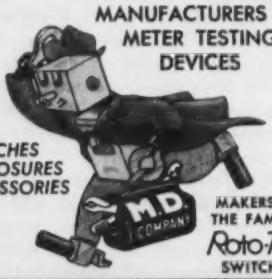
• **R. H. Sroufe** has been made executive vice-president and director of Stubbs Electric Co., Portland distributor of electrical apparatus and supplies. **Hugh M. Hanna** continues as general manager and **A. I. Nichols** as secretary-treasurer. Sroufe was formerly with Westinghouse Electric Supply.

• **Howard Foundry Co.** has announced formation of a subsidiary, Howard Electric Co., to manufacture a new type of electrical underfloor system for office and industrial buildings. One of the company's foundry plants is located in Los Angeles.

• **Ilsco** Copper Tube & Products Inc. of Cincinnati has been acquired by Oliver L. Bardes and renamed Ilsco Corp. Operations are to continue with the same management, headed by President **Andrew H. Stubbers.**

• **Vinson-Carter Electric Co.,** 325 N. Fourth St., Phoenix, has been named a distributor for Allis-Chalmers control equipment in Arizona. **B. F. Carter** heads the company, which has been a distributor for A-C motors since October 1953.

LARGEST EXCLUSIVE MANUFACTURERS OF METER TESTING DEVICES



SWITCHES
ENCLOSURES
ACCESSORIES

MAKERS OF THE FAMOUS Roto-Test SWITCHES

METER DEVICES
COMPANY • CANTON, OHIO

WANTED—TECHNICAL BOOKS

We are looking for copies of these two books:

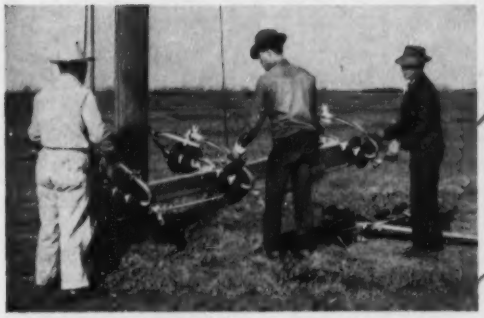
"Rules for Overhead Line Construction"
General Order No. 64
California Railroad Commission
printed by California State Printing Office, 1922

"Rules for Overhead Line Construction"
General Order No. 64-A
California Railroad Commission
printed by California State Printing Office, 1928

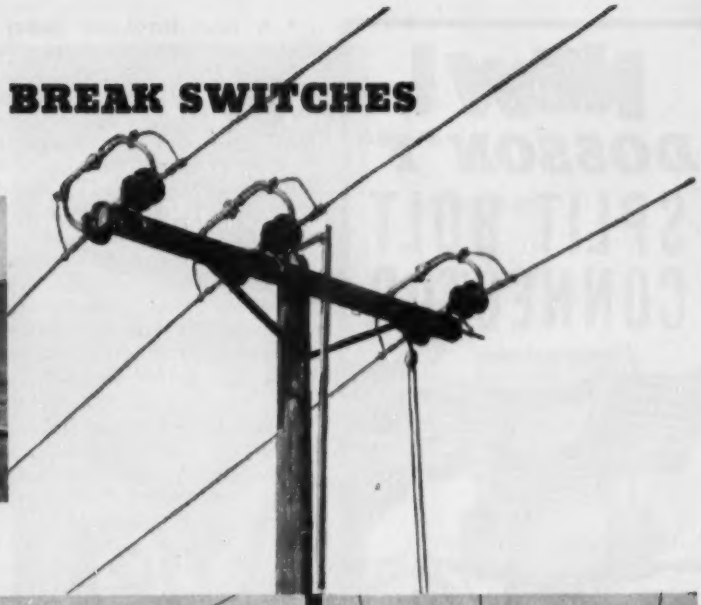
If you have spare copies of either or both, please write

W. H. Biegel, Claims Department
Southern California Edison Company
P.O. Box 351, Los Angeles 53, California

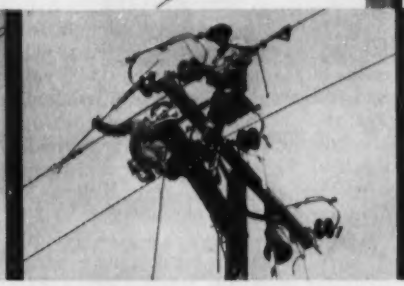
KPF AIR BREAK SWITCHES



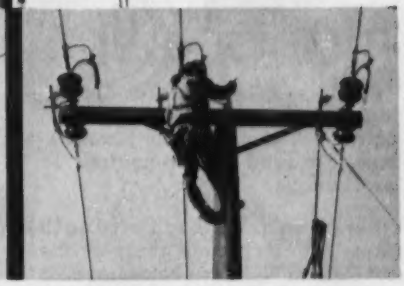
1 Sturdy factory-assembled phase units are bolted to cross-arm and push-pull interphase control rods installed on the ground. (Installation is equally simple in the air on installed cross-arms.)



2 At pole top, linemen receive switch bolted to cross-arm and ready to install on pole. Simple design and use of quality materials means KPF phase units are rugged, yet amazingly light weight.



3 Cross-arm bolted to pole, braces and first section of control rod installed. Linemen connect conductors quickly and easily to any standard strain clamp and dead-end direct to phase units.



4 Conductors connected, crank arm being adjusted on push-pull interphase control rod. Like KPF switches and Quick-Breaks, KPF controls need no lubricating. They crack off any icing, are never affected by cross-arm warpage.

Time-tested KPF switches install simply, easily—in 1/2 normal time

KPF switches—the switches that look different because they *are* different—install differently, too. Experience of leading Western power companies shows that KPF switches are normally installed in ½ the time required for complex, cumbersome ordinary equipment. Each KPF phase unit is light weight, readily handled by one man. No extra cross-arms or special supporting structures are needed. Each phase unit is fully assembled, tested and adjusted at the factory. The unit is ready to operate when it reaches the job—no waste of lineman's time. Dependable KPF switches may be mounted horizontally, vertically or triangularly with equal success and long-term, trouble-free service.

For the world's simplest, surest, lowest cost air break switch, specify KPF—standard for nearly 50 years.

KPF
AIR BREAK SWITCHES
Standard for nearly half a century

New catalog gives complete specifications, detail drawings, installation data.

5 Installation complete. Lineman installs operating lever and last section of control rod. Note the neat, clean pole top appearance of KPF switches—a familiar sight throughout the West on such famous systems as PG&E, Southern California Edison and others.

KPF ELECTRIC COMPANY
1624 East Alpine Avenue, Dept. W, Stockton 5, California

7997

NEW!

DOSSON "F"

SPLIT BOLT CONNECTOR

For:

taps, dead-ends, service entrances, motor leads, junction boxes, ground wire-to-neutral connections

Fabricated from high strength alloys, all component parts of the new Dosson "F" Connector are cold formed, insuring consistent uniformity and high quality. Can be used economically over and over again!

Why It's Your Best Bet:

- high clamping pressure insures tight contact
- maximum tightening force: high translation of tightening torque
- connector alloys possess greater physical properties than average steels
- longer bearing pressure bars avoid conductor crushing, load concentration
- smooth edges can't cut lineman's gloves, nick conductors
- withstands high overload, vibration, corrosion

50 YEARS OF TECHNICAL KNOW-HOW

FREE SAMPLE upon request. Write today!

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DOSSERT MFG. CORP.

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SINCE 1904

• **A new distributor policy** for its electrical tapes has been announced by the Okonite Co. of Passaic, N. J. Okonite, Manson, Okoprene and Okolite Panther and Dragon tapes will be sold exclusively through selected distributors. According to Bradford M. Harrington, head of the Okonite Tape Department, the distributor plan provides increased profit margins, protection against loss through price changes, obsolescence and inventory problems and eliminates direct sales. Stepped-up sales promotion and advertising campaigns are also a part of the plan.

• **Day-Brite Lighting** Inc., one of the nation's leading manufacturers of lighting equipment, has incorporated Day-Brite Inc. of California and will build a $250,000 office and plant in Santa Clara. Matthew A. Cabott, Western district manager, announced. The property, located on Martin Ave. near Lafayette, is large enough for later expansion. The first wing will cover 30,000 sq ft of which 3,000 will be in office space. It will be a windowless, air conditioned building of tilt-up construction, area lighted to a minimum of 50 f-c. Blanchard & Maher are the architects and Keller & Gannon electrical engineers.

• **F. A. Henry** has been made general manager of A. O. Smith Corp.'s Pacific Coast Works at Los Angeles, succeeding **A. W. Shuman,** resigned. Henry was transferred from Milwaukee to the West Coast.

• **Anaconda Wire & Cable Co.** is installing a $1,000,000 automatically operated aluminum rod rolling mill in its new plant under construction in Great Falls, Mont.

• **Afton Lemp Electric Co.,** wholesale distributor in Boise, has just moved to a much larger, new building of its own at 620 S. Ninth St. Whereas it had 9,000 sq ft before, this building has 19.000, has trackage and was designed especially for efficient distribution.

• **Chester Cable Corp.** of Chester, N. Y., has announced it will maintain a Pacific Coast warehouse stock of its various products. The office and warehouse will be located at 338 E. Second St., Los Angeles, where Joseph Liner, sales representative, has headquarters. The stock procurement address is 331½ Azusa St., Los Angeles.

• **S. E. Gardner** has been transferred from Chicago to Los Angeles as field representative for Pittsburgh Reflector Co.

STRENGTH, ENDURANCE that Meet the Test!

Crapo Guy and Messenger Strand

IN THE FIELD as in laboratory tests . . . Crapo Galvanized Steel Strand proves itself capable of withstanding severe punishment. Steel's inherent strength and durability are combined with definite economies in every size and grade of Crapo Steel Strand. You'll find the heavy, ductile, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide lasting protection against corrosion.

Contact your jobber of Crapo Galvanized Products or write direct for further information!

INDIANA STEEL & WIRE COMPANY MUNCIE, INDIANA

SAVES YOU MONEY

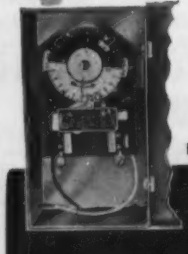
DAY-IN DAY-OUT

TORK ASTRONOMICAL CONTROL

Now ready, as a kit, to fit any regular model on the job. Simple to change. Saves time—Saves money.

ON AT SUNSET—OFF AT SUNRISE or a fixed time, 10:30 p.m. to 1:30 a.m.

• Tork Time Switches require no attention—this feature $12.00. A must on all public safety lighting. An economy on all commercial lighting. Tork is fully automatic. No one forgets.



PLAY SAFE – USE THE BEST

Stocked in L.A.–S.F.–SEATTLE

TORK CLOCK CO.

One Grove Street Mount Vernon New York

NEWS ABOUT PEOPLE

• **Walter D. Howell,** East Bay division commercial manager for Pacific Gas and Electric Co. since June 1948, will become manager of agricultural sales and special accounts upon the retirement in December of **E. G. Stahl,** it was announced by O. R. Doerr, vice-president in charge of sales. **Douglas S. Aiken,** San Jose division commercial manager, will succeed Howell in Oakland; **C. Elliott Ginochio,** Colgate division commercial manager, will go to San Jose and will be replaced at Marysville by **C. L. D. Heller,** commercial manager in Eureka. **George P. Cornwell,** who has been the Humboldt division's special representative, will take the Eureka post. Stahl has been in charge of agricultural sales for the company since 1945. He started in 1919 with the San Joaquin Light & Power Corp., a predecessor of PG and E. Howell joined PG and E in 1926.

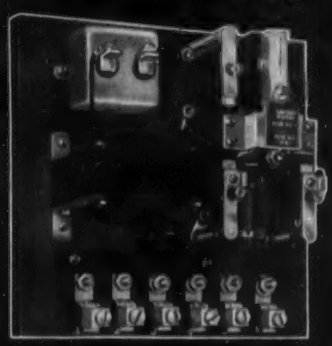
• **L. F. Dudley,** with Square D Co. for 20 years, has been made personnel director in Los Angeles, succeeding **James Burns.** He will administer personnel policies for the firm's 340 employees in the Los Angeles area. Dudley joined the company in 1934 at Milwaukee and has served in Cincinnati and San Francisco.

• **Appointment** of **Edward F. Hall** as stock transfer agent and promotion of **A. H. Catherall** to assistant secretary and assistant cashier have been announced by Pacific Gas and Electric Co. Hall succeeds **A. W. Uhrich,** who retired after 44 years in the utility business. Catherall succeeds **C. L. Hornberger,** who retired after 43 years of service.

• **Frank H. Woy,** rate engineer for Montana Power Co. since 1945, has been made an executive assistant and manager of the company's department of rates and depreciation.

• **Dave Shore,** superintendent of Pacific Power & Light Co.'s Merwin hydroelectric dam and power house and unofficial host of thousands of picnickers at that project since 1931, has retired after some 60 years in the industry. Shore joined the organization in 1913 while visiting the West at the request of L. T. Merwin, for whom the dam and plant later was named. His first appointment was at the White Salmon river plant.

ASCO
current sensitive
close-differential
relay



process *control* by motor current *measurement*

This Relay offers wide possibilities for automatic control problems. Why not investigate it for use with your process or equipment?

- **2% SENSITIVITY**
- **CONTINUOUS DROP-OUT ADJUSTMENT**—with factory-set pickup. (Also designed with a continuous pickup adjustment.)
- **SUPPLIED IN ANY POLE COMBINATION**—to 2 normally open, 2 normally closed.
- **OPEN OR ENCLOSED**
- **ELECTRICAL RATINGS**—Contacts rated 5 amps Continuous Current, 600 Volts Maximum; Coils to 60 Amp. Capacity—higher when supplied with current transformers.
- **VOLTAGE-TYPE AVAILABLE**—comparable construction and operating characteristics.
- **SPECIAL MODIFICATIONS**—high shock designs, variable pickup, frequency response, delayed action, etc.

Mixing a batch?

Assume you have a batch mixing process where the viscosity increases progressively as the batch nears completion. The current drawn by the driving motor will increase with the viscosity. An ASCO Close-Differential Relay could be used to automatically open the motor control circuit at the exact batch viscosity desired. This would be accomplished by merely calibrating relay operation to the current corresponding to desired viscosity.

In general, this ASCO Relay can provide a triggering impulse or trip in systems designed to control innumerable operations where electric motors are the power source or where current variations occur. Such systems include devices for the control of polymerization, measurement of viscosity, regulation of flow, etc.

when you can predict a current variable . . . consider an ASCO Close-Differential Relay for your automatic control.

FOR COMPLETE INFORMATION—Send for our Publication 69R1 on ASCO CLOSE-DIFFERENTIAL RELAYS.

ASCO Solenoid VALVES

ASCO Electro-Magnetic CONTROLS

Automatic Switch Co.

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• **Several new positions** have been created in an administrative reorganization of Seattle City Light, already approved by the city council and scheduled to go into effect next year. The new positions are executive assistant superintendent, at $13,200 a year; chief engineer, $10,200; chief of operations, $9,600; and administrative assistant, $7,200. **John M. Nelson,** an assistant superintendent, will become executive assistant superintendent, under the new program. He will have general supervision of the department subject to the approval of Superintendent Paul J. Raver. The other new positions will be filled within the department's present personnel. **P. C. Spowart** and **Ira L. Cottom,** assistant superintendents in charge of commercial sales and properties respectively, will continue in those positions.

• **Daniel Rashall** was promoted to the post of national sales coordinator for Sunbeam Lighting Co. He joined the company last June as sales promotion and public relations director. He formerly was managing director of the Western Lighting Manufacturers Institute.

• **Lloyd Edwards,** former operating supervisor for Mountain States Power Co. at Albany, has been made assistant vice-president and will be stationed in Casper. He will assist W. D. Johnston, vice-president and chief of company operations in Wyoming.

• **Don Willis,** Arizona Public Service Co., was co-chairman of the fifth annual Workshop Conference of the Electric Companies Public Information Program in St. Louis, Oct. 27-29. **Henry B. Sargent,** Arizona Public Service president and vice-chairman of PIP, was a dinner speaker and **John N. Kerr Jr.,** Public Service of Colorado, was moderator of a panel, "Telling Our Story Within the Company."

• **Col. H. George Gerdes** (USA-Ret) has been named power engineer for Kaiser Engineers Division of Henry J. Kaiser Co. and assigned to the hydroelectric power development program.

• **Bernard C. West** of Tacoma joined Federal Pacific Electric Co. as apparatus engineer and will operate out of the Seattle office under the direction of District Manager Cutter. West was formerly sales manager of Pacific Oerlikon Co. and had previous connections with Westinghouse.

• **W. Swanson** has joined the dealer services branch of the B. C. Electric at Vancouver, B.C.

White

• **Horace L. White,** Pacific division manager of Crouse-Hinds Co., has been appointed a commercial vice-president of that firm. He will continue to head the company's sales, sales engineering and marketing programs in nine Western states. He has represented Crouse-Hinds in the West for 30 years, first as a sales representative and since 1939 as divisional manager. His headquarters are in Los Angeles.

• **Byron K. Taylor,** member of the Eugene Water and Electric Board staff since 1931, has been appointed assistant superintendent to succeed **Byron L. Price,** who resigned to become administrator of the Bonneville Power Administration. Taylor for the past several years has been chief civil engineer and in charge of the Oregon municipal system's hydroelectric plants and planning. Before joining the Eugene organization, he was on the engineering staff of Portland Electric Power Co. and Washington Water Power Co. and was with the Interstate Commerce Commission.

• **Several changes** have been made in supervisory and engineering personnel of Tacoma City Light, to expedite preparation of plans and construction of dam projects on the Cowlitz and Skokomish Rivers. **Vivan B. Jones,** power manager, is given additional duties as assistant superintendent of the light division. He will supervise all operational functions under Superintendent **Henry A. Cole** except engineering. **John D. Ferguson,** supervising electrical engineer, was promoted to chief electrical engineer. He replaces **A. D. Francis,** who is transferred to project design and construction. Ferguson's former post goes to **Ronald M. Boyles. Carl F. Pflugmacher** was advanced to supervising civil engineer and will continue as acting project engineer in charge of project design and construction, pending appointment of a chief engineer for the two projects. **Roy K. Cramer,** supervising civil engineer, and **Harry M. Manning,** power plant engineer, were assigned to project design and construction.

• **Robert C. Harper** has been appointed Western regional sales manager for lighting by Sylvania Electric Products Inc. Harper will be headquartered in San Francisco. **William L. Friend** will be moved from Emeryville to take over Harper's former post as Los Angeles district sales manager and **Robert W. Thunen** will succeed Friend as district engineer in Emeryville.

• **Ray L. Hamilton** has been named vice-president of Bechtel Corp. He joined the company in 1940 after 13 years as a gas and pipeline engineer for Standard Oil Co. of California.

Deaths

• **Albert LeRoy Stone,** retired former owner of Stone Electrical Supply Co., Los Angeles, died recently after a long illness. He served many years as treasurer and later was president of the Los Angeles Chapter, NECA, and for ten years as vice-president and member of NECA's administrative committee, representing the West. He was also treasurer of the Los Angeles Home Show and one of its founders.

• **Sam Russell,** president and owner of H. B. Squires & Co., manufacturers' representative in San Francisco for the past 40 or 50 years, died Oct. 14. He was one of the founders of the Northern California Section of IES.

• **Francis Q. Irwin,** partner in Western States Electric Co., San Diego, and prior to that with Coast Electric Co., died Oct. 1 in San Diego.

• **Frank Gregg,** manufacturers' representative, and for some years with E. A. Wilcox Co., died recently in Glendale.

• **James W. Condon,** 58, manager of the Frigidaire Division of Sunset Electric at Seattle, died Aug. 29 of a heart attack while in Portland on a business trip. He had been with the distributing firm in Seattle and Portland for 20 years.

• **George C. Sears,** 70, who retired last year as superintendent of the division of power supply of Puget Sound Power & Light Co., died Sept. 28 at Seattle. Born in Salem, Ore., Sears started work at 18 as a substation operator.

even in
an age of speed...
sheer velocity is not
always an asset...

...in fact
there are some
instances...

...where it's
a real
liability!

take low disc speed in a meter...

Speed is definitely not an asset in the turning rate of a watt-hour meter disk.

That's why the disk in the Sangamo J2 Watthour Meter revolves at a low, low rate of speed—only 10 revolutions per minute at the nameplate rating of 15 amperes. And only 66⅔ revolutions per minute or approximately one revolution a second when the J2 is busy measuring a full load of 100 amperes. Yet the J2 has exceptionally high driving power.

This means the Sangamo J2 lasts longer and requires less maintenance than ordinary meters . . . there's less wear on all moving parts.

It means good public relations, too. Mr. Customer doesn't like to see his meter spin.

A METER WITH STRAIGHT LINE ACCURACY

UP TO 100 AMPERES

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM54-10

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PROFILES

Bailey

Joyce

A. R. Bailey, vice-president of Coast Counties G&E, was made assistant to Vice-president and General Manager Norman Sutherland of PG and E following consolidation

R. W. Joyce became commercial manager of Pacific Gas and Electric Co. following the recent retirement of James F. Pollard

J. F. Emery was made superintendent of electrical operations and construction of Idaho Power Co. in recent promotions

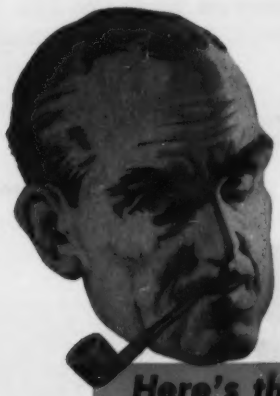
L. F. Dudley has succeeded James Burns as Square D personnel director in Los Angeles. He joined the company in 1934

N. H. Callard is now operations and maintenance director for Bonneville Power Administration. Formerly with Westinghouse he became Hilo Electric manager in 1947

Emery

Dudley

Callard



A STATION ENGINEER ASKS—

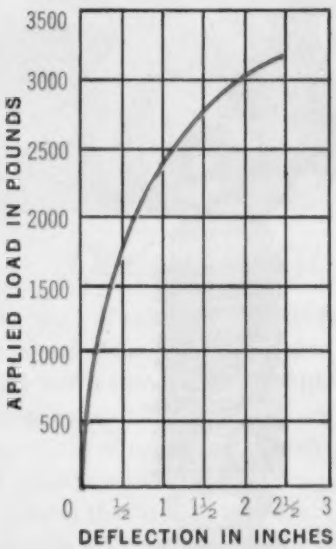
"Why is it necessary to shim 69 K.V. switch units ?"

Here's the ANSWER: *You don't have to when you use Pinco L-6069 Switch and Bus Units.*

Here's WHY:

The Pinco L-6069 Switch and Bus Unit employs a ribbed malleable iron pin to give it the rigidity and strength required in this unit's application.

Here's the PROOF: The deflection curve below shows the rigidity of the Pinco L-6069 Switch and Bus Unit under various loads. The secret of Pinco's perfect alignment even when horizontally mounted, lies in the balanced design of the porcelain and hardware.



SPECIFICATIONS

PINCO L-6069 SWITCH and BUS UNIT

Cantilever Strength, upright (Base mounted)	1500 lbs.
Cantilever Strength, underhung (Cap mounted)	1000 lbs.
Torsion Strength	15,000 inch lbs.
Tension Strength	12,000 lbs.

This Unit More Than Meets The Above Ratings

SEE PAGE 116, PINCO CATALOG NO. 49 FOR COMPLETE ELECTRICAL AND MECHANICAL CHARACTERISTICS

PINCO INSULATORS

RIGHT ON THE JOB!

The Porcelain Insulator Corporation
766 Main St., Lima, N. Y.

If you don't have a copy of the Pinco Catalog, write us, or contact the Joslyn Pacific Co. office in your locality.

Cole Electric Co.

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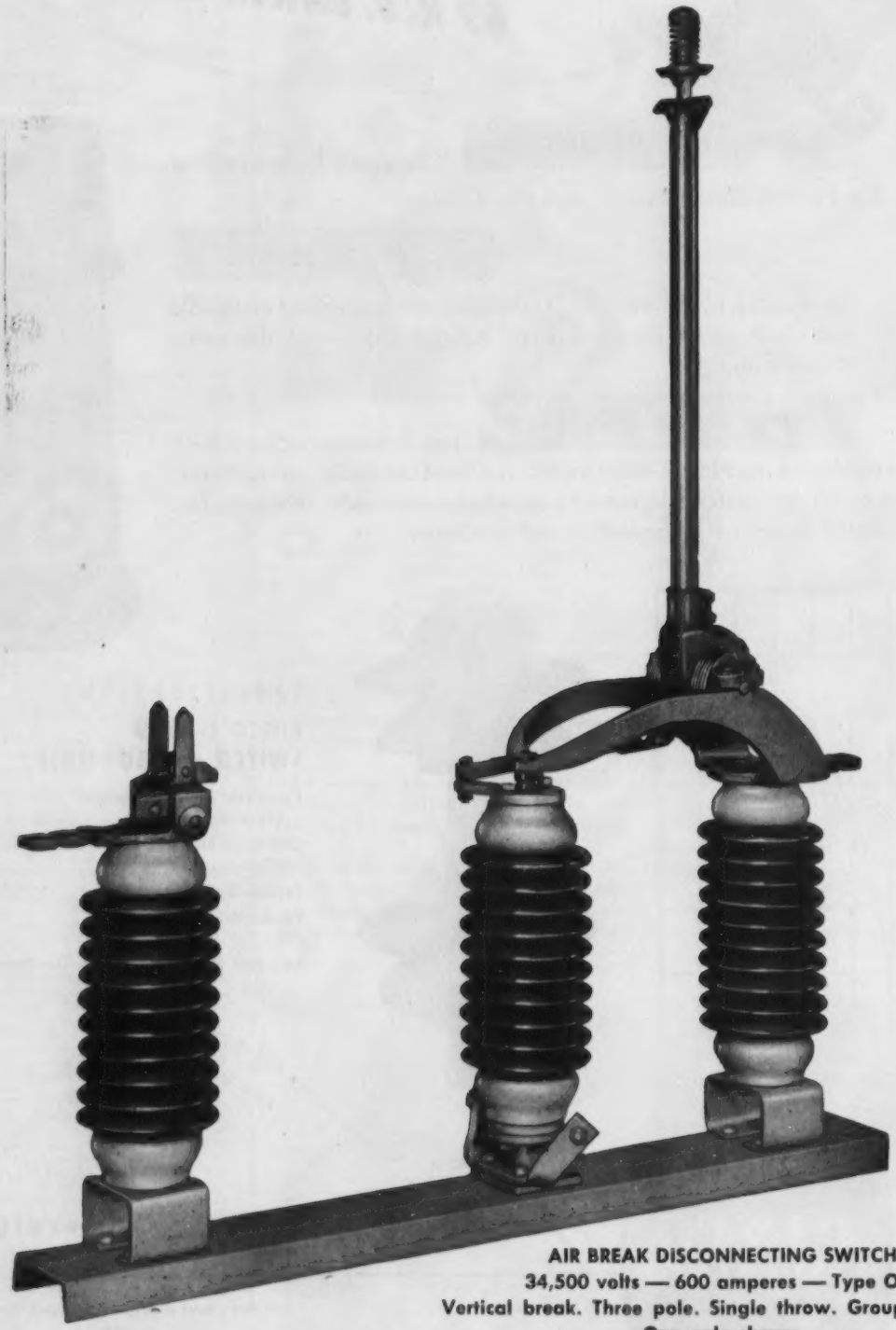
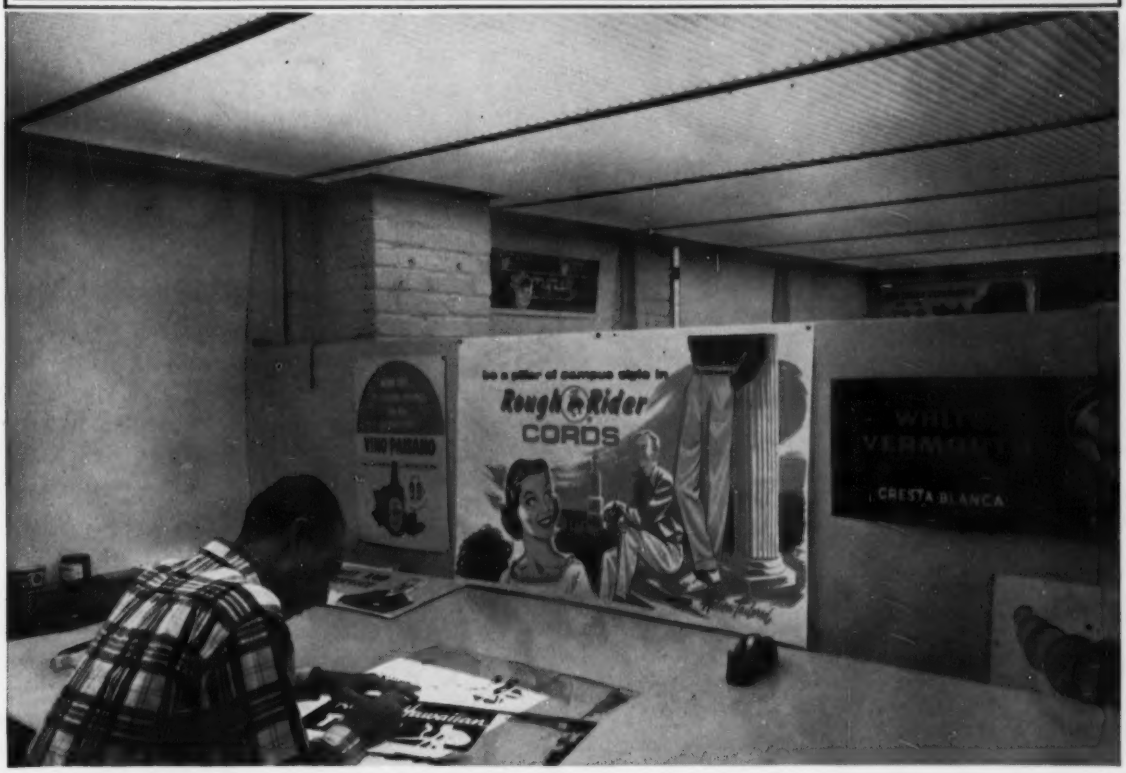


AIR BREAK DISCONNECTING SWITCH
34,500 volts — 600 amperes — Type O-2
Vertical break. Three pole. Single throw. Group operated.
One pole shown.
SILVER TO SILVER CONTACTS

Why Velvetone's doubt about *Planned Lighting* turned to praise–



Odds are it'll help your people do better work, too

The work of silk-screen artists for the Velvetone Company, San Francisco, takes a fine sense of color and a sure touch. But with the lighting the company used to have, shadows and glare often made it hard to do careful work, and caused lots of eyestrain. That's why Velvetone—though doubtful that its lighting could be improved—called in P. G. and E.'s lighting engineers.

Following a free survey, our engineers suggested a luminous ceiling for shadowless, glare-free light . . . cool-white lamps for accurate color work.

Result: "Our artists do a better job, make fewer mistakes, turn out more work," reports Velvetone. "And eyestrain no longer keeps them from enjoying the evening paper at the end of a day." Cost: $600 . . . "mighty little to pay when you figure all the ways planned lighting helps us."

Your business is probably different from Velvetone's. But it's a good bet planned lighting will benefit your employees in the same ways. And you pay nothing to find out. So let our lighting engineers make a survey for you soon.

For free planned-lighting advice, call your nearest P. G. and E. office today

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

407-X-554

MEET A LIVE WIRE!

• *Sam W. Scott*

a member of the Pacific Coast Electrical Association since 1945, is now in the midst of his first term as an Association Vice President and his third as Director. Over the years he has been active in PCEA's Business Development Section.

Born in Arizona, Scott moved to Los Angeles at an early age and has made that city his home ever since. After completing grade school in 1914, he began his business career as an office boy with Westinghouse Electric Manufacturing Company, Los Angeles. Twelve years and several promotions later, he left to go into the manufacture and sale of automotive equipment. In 1928 he returned to the electric industry, joining GraybaR Electric Company as a salesman. Nine years later he was appointed District Merchandising Manager; became District Sales Manager in 1944, and in 1951 was promoted to his present position as Pacific District Manager.

HELPING the electric industry make and sell more products, create more and better jobs, and make living safer, easier and more pleasant for everyone — is quite a job! But we in PCEA are busily engaged in doing just that. With the help of men like Sam Scott we're working for the good of the entire electric industry. If you're connected with the industry in any way, that means for your good, too. That's why we urge you to join us in PCEA. There's a definite place for you in our organization where your particular talents can be used to advantage, and your particular interests served. Contact either of our offices for further information.

Pacific Coast Electrical Association

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